Plan of Development

Quintillion North Slope Emergency Service Restoration
GMT2 to Utqiagvik
UPDATE November 10th, 2025

1. GENERAL DESCRIPTION

Several North Slope Borough (NSB) and Northwest Arctic Borough (NAB) communities unexpectedly lost essential telecommunications services in early June 2023 when a subsea fiber optic cable (FOC) was severed in approximately 25-30M of water in the Beaufort Sea[1]. A repair vessel was finally able to reach the location of the severed FOC in late August 2023 when sea ice had cleared from the region. However, the repaired linear system remained vulnerable to another disruption event and a long-term outage without an overland backup connection. Early Saturday morning (January 18 2025), Quintillion became aware of a subsequent network outage affecting North Slope and Northwest Alaska communities caused by a severing of the subsea fiber optic cable in the Beaufort Sea. Quintillion proposes a winter overland installation of a terrestrial fiber optic cable (FOC) between an inland connection point and Utqiaġvik. Two alignments are under consideration to enable schedule-reliable construction within the tundra-travel window:

Alternative A (GMT2): ConocoPhillips' GMT2 facility to Utqiaġvik, approximately 171 route miles.
Alternative B (NOP): Santos' NOP facility to Utqiaġvik via the Community Winter Access Trail (CWAT) corridor, crossing the Colville River onto State of Alaska lands and then proceeding north to NOP, approximately 238 route miles in total.

Both alternatives seek to maximize use of established winter corridors and minimize new disturbance while achieving a resilient terrestrial back-up to coastal systems.

The proposed routes to Utqiagvik will generally follow the NSB's Community Winter Access Trail (CWAT), which has been used over the last several years as part of the Arctic Strategic Transportation and Resources (ASTAR) Project[2] to connect North Slope communities to the road system in winter (Figure 1). The CWAT has been previously surveyed for cultural resources and is an established corridor for winter transportation. Quintillion proposed an initial design corridor of 1/2-mile on either side of the CWAT centerline (1-mile-wide corridor in total) to provide flexibility in routing. This ensured the FOC would not be damaged during CWAT construction and served to minimize environmental impacts.

Phased Construction: To optimize schedule within tundra-travel windows and supply availability, the work may be executed over two winter seasons. Season 1 (2025-2026) installs the fiber between Utqiaġvik and AMP #1 (~MP 100) and completes selected aerial/elevated crossings on BLM lands beyond that point eastward. Season 2 (2026-2027) completes the remaining reach to the inland facility and any State of Alaska segments pending DNR easement. Final end-to-end turn-up occurs after Season 2.

[1] https://alaskapublic.org/2023/06/12/cut-cable-causes-weeks-long-north-slope-northwest-alaska-internet-and-cellphone-outages/
[2] http://www.thearcticsounder.com/article/1817residents_drive_north_on_winter_snow_roads

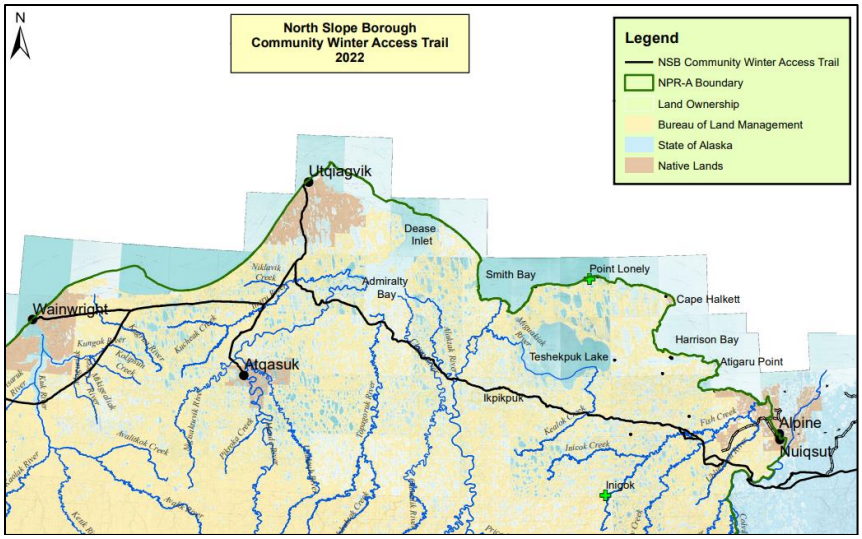


Figure 1. The proposed route would generally parallel a segment of the NSB CWAT.

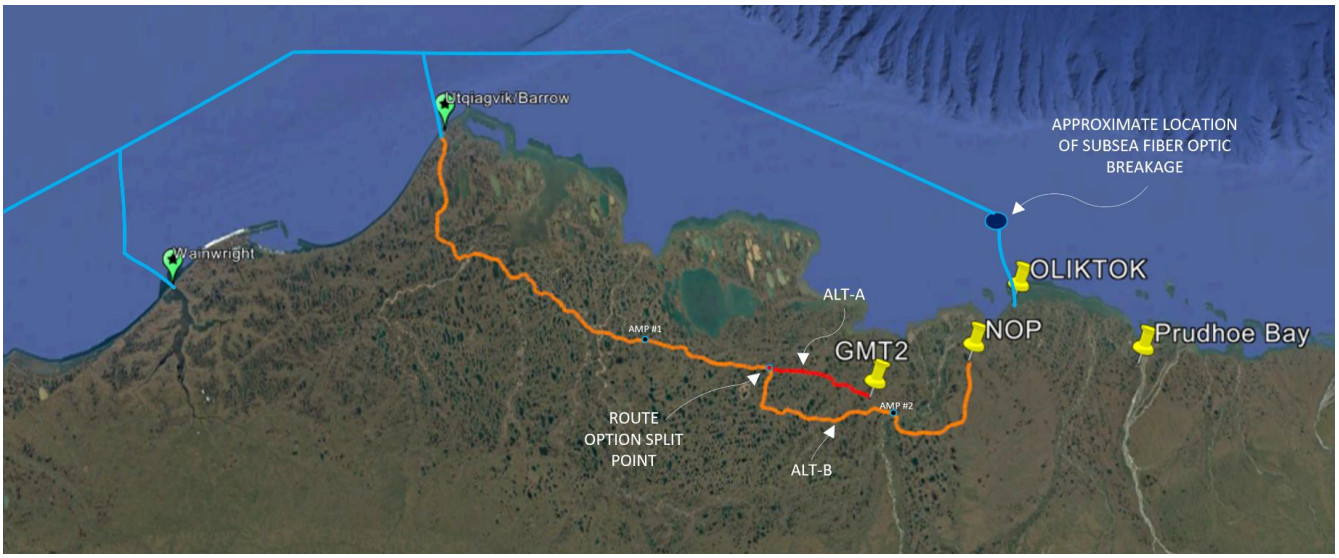


Figure 2. System Overview Map

CONSTRUCTION

Depending on the selected alternative, approximately 171–238 miles of new FOC will be installed on snow- and ice-covered tundra during the winter travel window, following the means and methods described herein (tundra lay, controlled crossing methods, and post-season settlement). A Grant of Federal Right-of-Way (ROW) from the U.S. Bureau of Land Management (BLM) through the National Petroleum Reserve in Alaska (NPRA) has been requested for approximately 155 miles of this route to restore essential

telecommunications services to the communities of Kotzebue, Nome, Point Hope, Wainwright, and Utqiagvik. A portion of the route (16.36 miles) is proposed for placement on Ukpeaġvik Iñupiat Corporation (UIC) and ASRC lands.

Alternative A (GMT2) would extend thru Kuukpik Corporation Lands to GMT2. (See Figure 7)

Alternative B (NOP) would extend parallel along the CWAT to the border of the NPRA at the Colville River and then route across approximately 38 miles ADNR lands to NOP. (See Figure 7)

Pre-construction, staging, and construction would occur during winter over approximately 120 days. Staging of materials and equipment would occur at Utqiagvik and Prudhoe Bay. Stream crossing methodology will vary based on timing / season of construction, stream bank gradient and composition, stream bed depth and characteristics, hydrology, soils, and vegetation.

This project will require FOC to be laid directly on the snow and ice-covered tundra landscape without trenching it into the ground. Follow-on maintenance work to adjust the FOC placement to ensure routing and settling would take during following years of operation. The proposed project design in which FOC is laid directly on tundra mimics a similar project nearby that was designed and constructed by the Arctic Slope Telephone Association Cooperative (ASTAC) (Figures 3 and 4). That project laid FOC directly on the tundra between Utqiagvik to Atqasuk (Figure 3) and at the bottom of inundated wetlands, ponds, and flowing streams. It also used some elevated stream crossings (Figure 4). The elevated stream crossing is described in more detail, below, and example typical drawings are provided in Appendix D. The ASTAC project eliminated the need for trenching over large portions of tundra, which can negatively impact permafrost, and has successfully provided service with negligible impacts to tundra.

Figure 3. ASTAC FOC on Tundra.

Figure 4. ASTAC Elevated Stream Crossing

Over time, the ASTAC FOC has settled into the tundra landscape and has become surrounded by growing tundra vegetation. This is understood to be less damaging to the tundra landscape than trenching, which disturbs the active layer of permafrost and creates issues related to thaw and drainage. Therefore, this project will allow the FOC to sink and settle into the tundra soils and sediments of inundated and non-inundated wetlands that are not flowing once snow melts.

Winter-approved ground vehicles with tracks, rolligons, and snowmachines will be used to transport FOC, crews, and equipment during construction. Equipment would be mounted to or towed by rolligons, snowcats

or similarly approved tracked vehicles. Transportation needs for staff, equipment, and supplies would be met by approved ground vehicles. Crews and the equipment train would initiate deployment from Deadhorse and Utqiagvik along the CWAT trail once open for winter travel and are to be cleaned and inspected in an approved facility before use on the project to ensure the absence of non-native species. The estimated equipment train and mobile camp consist of equipment described in Table 2. The proposed mobile camps consist of trailers or decked vehicles equipped with bunks and lavatory facilities, designed to move daily with the equipment train. The camp will support the planned individuals in each deployment group, requiring 3-4 camp vehicles or sleigh trailers per group. Waste management will be stringent, with all refuse, including human waste, being transported out for approved disposal. Camp trailers having 600 or fewer gallon fuel tanks with secondary containment will be utilized.
Fuel would be transported with each vehicle train in hauled fuel trailers with secondary containment – it is expected that 1-3 fuel trailers of up to 5,000 gallons each will be utilized with the Wet-Gap and Fiber deployment and Splice crew equipment trains. If refueling is necessary, the fuel trailers will proceed along the CWAT to refill at either Deadhorse or Utqiaġvik based on the shortest distance and fuel availability.

Depending on the route Approximately 30-40 reels of fiber, each measuring around 40,000 feet in length, are set to be deployed through ground vehicles in winter. Ground vehicles and service crews will slowly unspool and position the FOC on the tundra. The splice group crew will set up temporary splice tents or use a splice trailer to complete splicing at the ends of each spool, approximately every 7-8 miles, and at necessary wet-gap crossings. Small splice cases (approx. 9" x 24") will house the connections and will be left in place on the snow-covered tundra and marked with flexible fiberglass carsonite markers.

Helicopter Operations:

Helicopters will not be utilized for the winter deployment program. However, they will play a role in the operations portion of the project during non-winter months. Emergency repair operations will be conducted on an as-needed and approved basis, with each event requiring 4-6 landings.

For the initial deployment, planned alignment/settling trips for summer/fall 2026 will require 4 trips each with 8 takeoffs/landings, with locations to be identified after the initial deployment and BLM authorization for summer/fall travel.

Yearly summer/fall O&M operations will include:

Four maintenance/inspection trips, each requiring up to 6 landings/takeoffs with 3-4 working crew deployed on each landing.

Two refueling/maintenance trips to in-line amplifier sites (if utilized) in late summer/fall months, each requiring 4 landings/takeoffs.

Access for these operations will be provided via Bell 212 and/or Astar helicopters, primarily based out of Prudhoe Bay but potentially also from Utqiaġvik.

Summary of annual helicopter operations:

Total planned trips per year: 6 (4 maintenance/inspection + 2 refueling/maintenance)

Total planned landings/takeoffs per year: Up to 32 (24 for maintenance/inspection + 8 for refueling/maintenance)

Additional emergency repair operations: As needed, with 4-6 landings/takeoffs per event

All helicopter operations aim to minimize wildlife disturbance, with maintenance trips targeted for late shoulder months when possible. Emergency trips outside planned periods require separate approval. No camping or refueling operations are anticipated for helicopter-based maintenance or retrieval operations. Summer O&M maintenance trips will be planned and authorized with the BLM prior to proceeding.

Removal:

The removal of the fiber optic line would primarily be a winter operation, supported by two equipment trains akin to the ones used for deployment. These trains include self-contained camp facilities for the workforce and a fuel trailer. Leveraging the high tensile strength of the fiber cable, a snowcat applies a controlled pulling force to lift and extract the cable onto the snow's surface where it is exposed to be coiled onto spools for trailer recovery. During summer, amplifier sheds will be retrieved by helicopter, following a direct flight path from both Prudhoe Bay and Utqiagvik, requiring four landings per site recovery. There are no camping or refueling operations anticipated for the amplifiers' recovery. Poles will be excavated approximately 1-2 feet below the surface and cut, with the excavated material used to fill the resultant holes. Anchors cables will be cut 1 foot below ground line. Inert buried anchor plates will be left in place due to the significant excavation/disturbance required to remove them. The cable will be coiled and poles stacked for recovery via hauled trailer. During the removal phase, helicopters will be used for amplifier shed retrieval in the summer. These operations will follow a direct flight path from both Prudhoe Bay and Utqiagvik, requiring four landings per site recovery.

The CWAT will be used for some transportation needs, but tundra travel and work would occur off the CWAT where the FOC would be constructed. Quintillion will consult with BLM, NSB, ADNR and the ANC on the timing of winter tundra travel[3] for protection of the tundra and for ensuring safe and reliable winter ground transportation during construction. Quintillion will abide by the tundra travel authorization requirements for approved vehicles as defined and distributed by DNR DMLW Northern region.

Winter construction will allow for up to three different options for stream crossing mode:

Non-Elevated Crossings

- **Cable Lay:** A 3-5inch-wide slot would be cut through river ice using a rock saw or chain trencher down to water level, and the FOC with appropriate slack would be laid through the water column

[3] It is likely that BLM will defer to the Alaska Dept. of Natural Resources (ADNR) - Division of Mining, Land and Water (DMLW), Northern Region to define the approved North Slope winter travel window.

onto the stream bed, with some possible stream bank embedment required[4] (see additional details, below); or

- **Cable Plow/Trencher:** A 3-5 inch-wide slot would be cut through the river ice and up to 18" of the sediments below the streambed (non-permafrost zone) using a rock saw or chain trencher, and as necessary to streambed conditions followed by the cable being plowed in via plow chute and tamping down sediments of the plowed area (see additional details, below); or

Elevated Crossings

- **Elevated:** The FOC is elevated at a height of approx. 20ft over the stream (See Figure 3, above and Appendix D) with support poles, guy wires, and anchors used to complete the crossing. Ground vehicles primarily will be used to transport and place support poles at stream crossing locations.

For non-elevated crossing modes (cable laying and cable plowing/trenching), equipment to be used may include rolligons, enclosed tracked vehicles, snow machines, chain saws, rock saws, cable plow, and anchoring equipment. During the course of cable installation, the foreman will send a crew members ahead to check depths and the status of upcoming stream, river or water gap crossings.

If a non-elevated crossing is relatively shallow and has sufficient ice cover to support the passage of the equipment, no special consideration is needed. A slot in the ice would be cut with the chain-trencher and then the vibratory plow would plow the direct-bury cable into the stream bed at its maximum capable depth. Max depth for the plow without any special considerations is 5 feet from the ice surface. If some additional depth is needed and depending on equipment availability an extended trencher/plow would reach 7 feet below the ice surface. If a river crossing has greater combined depth of water and ice than the 7 feet listed above, the standard direct bury cable will be terminated on either side of the crossing with a 50-100-foot slack loop left at a splice case. The equipment will be walked to the opposite side of the river. A slot in the ice will be cut, and the submarine type cable will be laid across the river with slack loops provided at the splice cases. This cable will simply lie on the river bottom.

To help protect bottom-laid submarine cable from being pulled out by high velocity flowing water or debris in the water, anchors will be installed on both sides. If appropriate, the riverbank may be cut back from the water surface interface, and a small trench will be excavated to approximately 25-50 feet back from the top of bank. The cable will be laid in this trench, and at the end, a 24-inch plate anchor and rod will be installed. This is the same style rod used to anchor power poles, but utilized in a horizontal installation. The cable will be attached to the anchor by means of a split sock, which applies more and more grip to the cable as the pulling tension is increased, similar to finger cuffs.

Following FOC installation at streams and streambanks, a small track excavator would be the final piece of equipment to cross and will complete any stabilization or restoration needed. The small track excavator may cross up to three times to complete stabilization or restoration.

The installation method for pole placement at elevated stream crossing locations is as follows:

- A 18" - 24" diameter hole is augured into the soil to a depth of 10 feet.
- The pole is stood up in the hole, centered, and braced to the required angle.

[4] The FOC may need to be embedded into the stream bank that would require cutting a 3" slot in the top 18" of frozen soils of the active layer in and around the streambank (non-permafrost zone).

- The hole is backfilled with a sand slurry to the halfway full point. The sand slurry will back-freeze to the permafrost soils and ice below.
- After freezing, the upper half of the hole is backfilled with the same sand slurry mixture. The slurry should be flush with adjacent soils or preferably slightly mounded.
- The pole should be stable for climbing and loads after 24 hours.
- Spoils from augered holes will be mounded around the anchor poles. If the mound is significantly high (i.e. looks like more than would subside over time) they will be diffusely spread out in the area around the pole.

Water withdrawal is anticipated for onsite slurry mix and estimated to be less than 2,000 gallons per day may be used. A water withdrawal and use permit will be obtained from the Department of Fish & Game, and appropriate screens will be utilized as is standard practice during water withdrawal. As needed, a two-inch 120 gallon per minute pump will be used which will be screened in accordance with the National Marine Fisheries Service Pump Intake Screen Criteria for Water Drafting.

Route Alt-B Colville River Crossing (Options)
Two methods will remain available for construction:
(1) Aerial/elevated span with bank-mounted poles/anchors (outside active channel) and high-water clearance; and
(2) Bored (HDD) crossing beneath the active channel.
The final method selection will be based on ice and flow conditions, geotechnical data, permitting conditions, constructability, and risk to subsistence navigation and fish habitat.

Bored/HDD Crossing (Major River - Colville)
For the Colville River (Alternative B), a bored crossing option may be used to avoid in-channel disturbance. The preferred trenchless method is Horizontal Directional Drilling (HDD) from ice-pad or temporary winter work areas on each bank, installing a conduit(s) through which the FOC is subsequently pulled. (See appendix D Detail 5.8)

Amplification Huts

The project may require two amplification huts to provide the strength of telecommunications service needed for the affected communities. the primary hut location would be on an existing gravel pad on the CWAT, approximately 100 mi. from Utqiagvik (Figure 5). The secondary hut would be located on the ground at the location of the Colville river crossing (figure 6). The operational ROW (yellow line/Fiber line) would expand beyond a 30’ corridor at these locations to 100’ around three sides of each hut to accommodate a site-specific placement of the hut and a temporary staging of vehicles or equipment, if needed.

Figure 5. Primary Hut Location (AMP #1)

Proposed AMP1 Approximate Location
Latitude: 70.454389°
Longitude: -154.335203°

Figure 6. Secondary Hut Location (AMP #2)

Proposed AMP2 Approximate Location
Latitude: 70.080768°
Longitude: -151.385368°

Amplification huts will be insulated and will have dimensions of approximately 8’ x 10’. They will be wired and powered for optimizing telecommunications performance. It will be equipped to provide power (generator, up to 500 gal. fuel reservoir, batteries) and will have heaters and fans for temperature control. The Hut will be trailer-mounted to be towed in behind a ground vehicle to the desired location. Depending on delivery method and ground conditions, it may be placed directly on the ground and/or placed on timber cribbing to prevent sinking or freezing to the ground. Other options include mounting the hut on skids or leaving it mounted on trailers.

Facility Interface & Road Crossing

The project may require a road crossing at the selected facility demarcation (GMT2 for Alternative A or NOP for Alternative B) and local access roads. Where a buried or above-tundra road crossing is necessary, the method will be either a short HDD (<150 ft) or a narrow trench (<12 in) within the road prism, coordinated with the facility operator and consistent with tundra and road protection requirements.

LAND USE

Rationale for Quintillion's Proposed Route through NPR-A North Slope Emergency Overland Reconnection and Backup Telecommunications Service

The Community Winter Access Trail (CWAT) as an Initial Basis for Design

Quintillion's proposed route for a fiber optic cable (FOC) through the NPR-A between GMT2 and Utqiagvik used the Community Winter Access Trail (CWAT) as an initial basis for design. The rationale for using the CWAT as a starting point in design was that the engineering for this lineal infrastructure project had already designed for ideal locations of waterbody crossings and terrain features and had worked to minimize impacts to important cultural or archeological resources, polar bear and caribou habitat areas, and locations for subsistence activities.

Alternative B formalizes use of the CWAT corridor to the Colville River crossing, with a northward segment on SOA lands to the NOP facility.

To preserve schedule flexibility and reduce reliance on any single third-party corridor, Quintillion developed a second, fully buildable alignment (Alternative B) that utilizes the CWAT, crosses the Colville River, and continues across State of Alaska lands to Santos' NOP facility. This option reduces exposure to private-lands timing dependencies while maintaining winter-only construction and minimal surface disturbance.

Stakeholder and Agency Input into Design

The North Slope Borough (NSB) and Bureau of Land Management (BLM) have recommended that, where possible, Quintillion place the FOC far enough away from the CWAT to avoid damaging it when the CWAT is constructed or used annually. ConocoPhillips, the GMT2 Operator, also has provided input on approach to GMT2 to keep construction or operation of the FOC from impacting their operational activities. This input was considered, along with balancing needs for sound engineering, constructability, and minimization of environmental impacts. Coordination will include State of Alaska DNR for the utility easement across state lands and ADF&G for major river crossing approvals; agency preferences and permitting will inform the Colville aerial vs. HDD selection.

Engineering and Constructability

Avoiding damage to the FOC from annual CWAT construction or use is an important consideration, but even more so is the project's constructability over or thru different types of waterbodies (e.g., streams, lakes, ponds) and terrain features. Reliability of service will depend on selecting the best stream crossing locations (typically fewer crossings, low flow areas, and shorter crossings are better) and keeping the FOC out of as many deep lakes or ponds as possible. Therefore, there are engineering reasons for the FOC to cross the CWAT on a few different occasions; the route takes advantage of some of the best

stream crossing locations and terrain slopes and features identified in CWAT development, and it avoids several deep lakes that exist adjacent to the CWAT. Alternative B adds ≈67 route miles relative to Alternative A. The construction approach (tundra lay, convoy logistics, and crossing methods) remains unchanged, with additional time allowances and staging sized to the selected alignment.

Environmental & Regulatory Considerations

Quintillion considered that moving the route further away from the CWAT centerline could result in:

• more frequent, more challenging, or longer stream crossings;

• more crossings of deep lakes and ponds;

• new impacts to cultural or archeological resources;

• duplicative or expanded impacts to polar bear or caribou.

• impacts nearer to important subsistence areas;

Furthermore, the NSB soon will need to renew its regulatory authorizations for the CWAT, and having additional lineal infrastructure within close proximity to the CWAT will help to promote the need for the CWAT as a more permanent transportation corridor. For Alternative B, a **state-managed corridor** (SOA lands) introduces a different permitting pathway compared to NPRA segments, including a **DNR utility easement**.

Selected Route Design

Quintillion's balanced approach for both route options (Alternative A and Alternative B) considers all of the factors described above. The alignment will remain largely within the one-mile-wide design corridor (½ mile on either side of the CWAT centerline), deviating only where necessary—near GMT2 to avoid interference with ConocoPhillips operations, and near NOP to follow the most direct and feasible route from the CWAT to the facility. For the remainder of the route within the mile-wide design corridor, there are times the route is some distance away from the CWAT (at times close to a mile away), and other times where the route will cross the CWAT or stay relatively close to it to minimize duplication or expansion of impacts to important resources.

Alternative Routes Not Selected

Quintillion evaluated alternative routes outside of the CWAT corridor, including the likely impacts to the environment and critical habitat areas.

Northern Route Alternative (not selected)

▪ A more direct route between GMT2 and Utqiagvik further north of the CWAT Corridor was considered in the design process. The route would have been in closer proximity to the Chukchi Sea and Beaufort Sea coasts. The alternative included options for laying the FOC around Teshekpuk Lake or even along the bottom of the lake.

▪ If maintenance was required to the FOC in summer or winter, it would present several environmental concerns. The area around Teshekpuk Lake is known to be extremely important for caribou calving and migration and for waterfowl nesting and rearing. Up to 46,000 caribou and 90,000 geese use the areas to

the north of the CWAT around Teshekpuk Lake, with over 40% of all North Slope aquatic birds visiting the general area in summer.

▪ A route to the north of the CWAT Corridor would traverse further into polar bear denning habitat and would increase the chances of interactions with denning or active polar bears during construction and maintenance. Polar bears are known to den or be active within 25 miles of the Chukchi Sea and Beaufort Sea coasts.

▪ The CWAT selected ideal areas for winter stream crossings and for winter travel over North Slope terrain. Quintillion's winter ground vehicles would benefit from crossing in the same general areas as the CWAT crossings. Moving out of the CWAT corridor would take more time to explore and design safe stream crossings for ground vehicles; Quintillion is trying to expedite emergency restoration and backup service for North Slope communities.

▪ Having a second separate corridor to the north, outside of the CWAT, rather than combining both lineal infrastructure projects into a single corridor, would compound potential impacts to polar bear, caribou, other wildlife, and subsistence users.

Southern Route Alternative (screened out)

▪ An alternative route to the south of the CWAT was screened out during initial evaluation of route alternatives. The only reasons to move further south of the CWAT would be to avoid BLM-managed lands, or to avoid more areas where polar bears may be active or denning. A route that achieved either of these goals would add substantial length to the FOC, rending the project impracticable.

▪ Having a second separate corridor to the south, outside of the CWAT, would reduce but would not eliminate the potential for impacts to polar bear during construction and operational phases. The project would still need to connect Utqiagvik to GMT2, both of which have polar bears present. The middle portion of the route could be routed further south, more than 25 miles away from the sea coasts, but this would unnecessarily add substantial length to the route and would result in more overall environmental impacts associated with a longer route.

▪ A longer route to the south would increase the potential impacts to wildlife, such as caribou, that would be associated with noise and visual disturbance to caribou and other wildlife during construction. It would require more FOC to be laid on the tundra and would result in more stream crossings. A higher frequency of stream crossings would increase the frequency of impacts to stream banks and fish habitat.

▪ Without the CWAT as a design basis, a more southerly route would take much longer to design around waterbodies and terrain features of a relatively untraversed area. Stream crossing modes for the FOC and locations of crossings for ground vehicles would require additional evaluation, taking more time. Quintillion is trying to expedite emergency restoration of service and longer-term backup service to North Slope communities.

Design Corridor

The project used a 1-mile-wide design corridor (1/2-mile either side of the CWAT centerline) in initial routing and design. Geospatial files depicting the corridor and FOC route have been provided to agencies.

Construction Corridor

Winter construction activities will require 250 ft on either side of the proposed FOC centerline (500 ft corridor in total) to determine the best location and method for exact FOC placement. The project will require a federal Grant of ROW from the BLM for segments on NPRA-managed lands, as well as private land-use agreements and/or Letters of Non-Objection (LNOs) with UIC and ASRC, who own the lands on approach to Utqiaġvik (see Table 1 and Figure 7). For Alternative-A, an LNO from ConocoPhillips and Kuukpik Corporation will be required to connect at GMT2. For Alternative-B, a State Grant of ROW from ADNR will be needed for DNR-managed lands (see Figure 7), along with an LNO from Santos.

Operation & Maintenance Corridor

The project will require a 30-ft wide corridor for Operation & Maintenance (15ft either side of FOC centerline) that will require year-round access (see details, below, in Operation and Maintenance section). Amplification huts require an additional 100' of ROW on three sides of each hut (Figures 4 and 5, above).

Figure 7. The federally-owned NPRA (yellow) dominates the North Slope between GMT2/NOP and other lands on approach to Utqiagvik (Barrow).

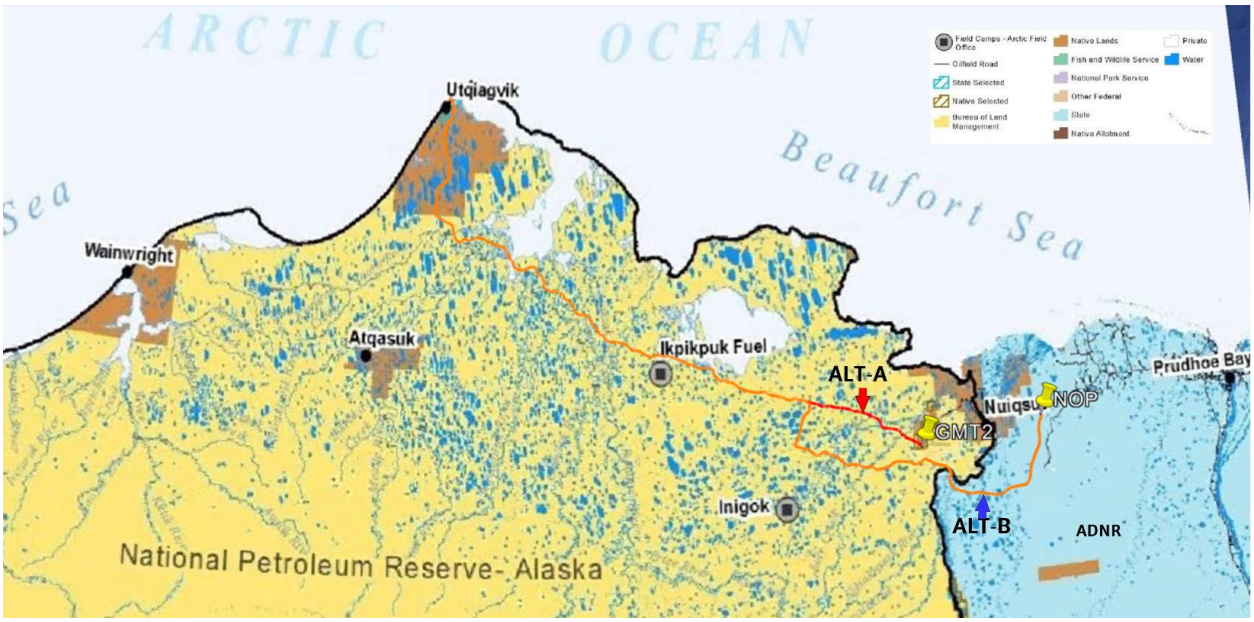


Figure 8. Quintillion will request a Letter of Non-Objection (LNO) from ConocoPhillips (leaseholder) to connect to GMT2 and obtain a utility ROW across the Greater Mooses Tooth Unit and Bear Tooth Unit.

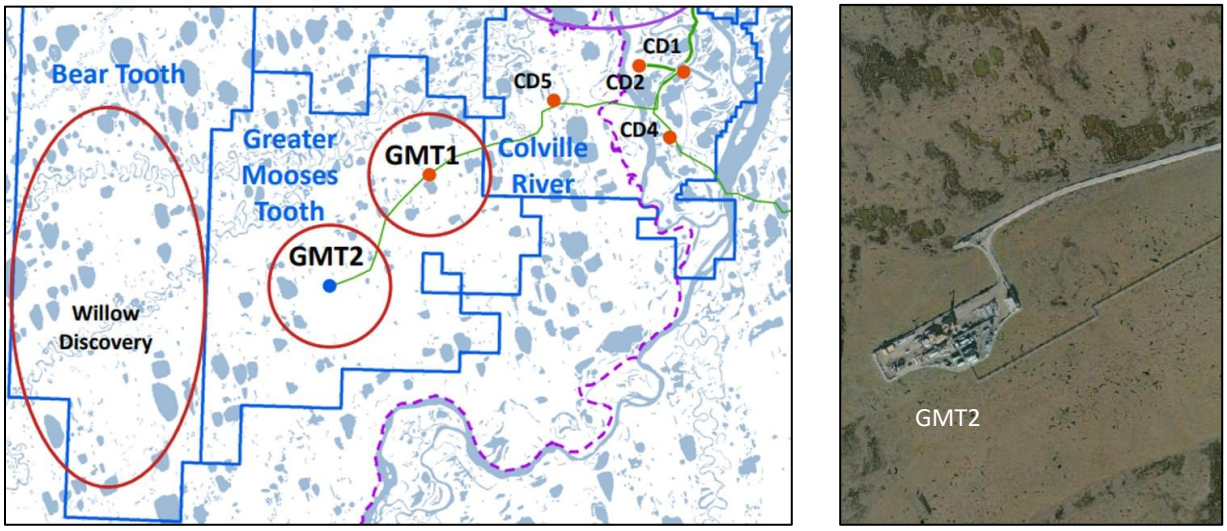


Figure 9. Quintillion will request a Letter of Non-Objection (LNO) from Santos (leaseholder) to connect to NOP and obtain a utility ROW across the Quokka Unit.

MTRS

The Median, Township, Range & Section (MTRS) for the project centerline are provided in Appendix B.

WATER CROSSINGS

A list of stream crossings and proposed crossing mode in winter and summer is provided in Appendix C. However, site-specific conditions may require a change to crossing method in the field. The project will require approximately 60 water crossings along the CWAT, including the following named streams:

- Judy Creek
- Fish Creek
- Kalikpik River
- Kealok Creek
- East Fork Ikpikpuk River
- Middle Fork Ikpikpuk River
- West Fork Ikpikpuk River
- Chipp River
- East Fork Topagoruk River
- Topagoruk River
- Meade River
- West Fork Meade River
- Inaru River
- Colville River

The FOC will cross several other unnamed streams, creeks and tributaries, as well as several inundated wetland areas across the tundra landscape. Once thaw occurs in spring 2026, the FOC will be settle in areas with standing water, sheet flow, ponds, and lakes.

Colville River Crossing.
The Colville River is the largest waterbody intersected by Alternative B (NOP route). To minimize environmental and subsistence impacts while maintaining schedule flexibility and long-term reliability, Quintillion is advancing two crossing options through design and permitting in parallel. The final method will be selected after reviewing field data, permitting and contractor constructability input.

Option A – Aerial/Elevated Span near the CWAT crossing.
This option maintains proximity to the existing Community Winter Access Trail (CWAT) river crossing. It comprises bank-mounted poles with guy anchors and elevated spans across the active channels. Poles and anchors will be set outside the ordinary high water (OHW) line. This approach is similar to the project's other large elevated crossings and facilitates inspection and maintenance from the banks.

Option B – Trenchless Bore (HDD) at a single consolidated channel east of the CWAT crossing.
This option deviates east to a location where the river narrows into a more defined, single crossing suitable for trenchless construction. The fiber will be installed within a conduit placed by Horizontal

Directional Drilling (HDD) from bank-top work areas, eliminating aerial structures and avoiding exposure to ice/runoff dynamics within the active channel.

Decision framework.
Both options will be carried forward through permitting to retain flexibility. The final selection will consider: (i) geotechnical conditions and drillability; (ii) ice and flood loads/clearances; (iii) constructability within the tundra-travel window; (iv) subsistence access/navigation and safety; (v) fish and fish-habitat protection; (vi) O&M reliability and inspectability; and (vii) cost and schedule.

LIST OF PERMITS OR AUTHORIZATIONS REQUIRED FROM AGENCIES

Quintillion will obtain required permits and authorizations for the project, as shown in Table 1, below. The applicable authorizations depend on the selected alternative. Alternative A includes NPRA/BLM segments and private-lands authorizations; Alternative B includes a State of Alaska (DNR) utility easement and related state approvals, with federal authorizations limited to waters/wetlands and any remaining federal tracts intersected by the route.

TABLE 1. LIST OF REQUIRED STATE AND FEDERAL AUTHORIZATIONS
Note: Authorizations vary by selected alternative (A: GMT2 ~171 mi; B: NOP ~238 mi)

Authorizing Party	Authorization
ConocoPhillips (ALT-A)	Letter of Non-Objection (LNO) – land access over leases and service connection to GMT2
Santos (ALT-B)	Letter of Non-Objection (LNO) – land access over leases and service connection to NOP
Ukpeaġvik Iñupiat Corporation (UIC)	Private Land Use Agreement and/or LNO – land access and ROW
Arctic Slope Regional Corporation (ASRC)	Private Land Use Agreement and/or LNO – land access and ROW
Kuukpik Corporation (ALT-A)	Private Land Use Agreement and/or LNO – land access and ROW
Bureau of Land Management (BLM)	Federal Grant of Right-of-Way – NPRA
Alaska Dept. of Fish and Game (ADF&G)	Fish Habitat Permits (Title 16) – low water crossings / FOC placement/ Water withdrawal and use permit
US Fish & Wildlife Service (USFWS)	Letter of Concurrence w/ BLM finding for emergency authorization
USFWS	Intentional Take Authorization and approved Polar Bear Plan
North Slope Borough (NSB)	Land Management Regulation (LMR) – Development Permit
U.S. Army Corps of Engineers (USACE)	Section 404 NWP 57
NSB	LNO for use of CWAT ROW and fuel storage pad
NSB	Certificate of TLUI Clearance Application
State of Alaska (DNR DMLW) (ALT-B)	Utility Easement /ROW

ANC = Alaska Native Corporation; CWAT = Community Winter Access Trail; FOC = Fiber optic cable; GMT2 = Greater Moose's Tooth 2; ROW = Right-of-Way; TLUI = Traditional Land Use Inventory

PRE-INSTALLATION ACTIVITIES & TIMING

Winter construction would likely occur between late December and May and will be dependent upon agency determination of the open winter travel window, which varies year-to-year. Pre-construction staging will occur prior to the open winter travel period at Deadhorse and Utqiagvik (e.g., in November or early December). Pre-construction clearing and grubbing are not expected to be required for this work prior to winter construction. If Alternative B is selected, overall field duration may increase due to additional mileage (≈+67 mi). Quintillion will mitigate schedule impacts by staging additional reels, optimizing convoy spacing, and, if needed, deploying parallel work fronts subject to tundra travel conditions.

EQUIPMENT AND STAFFING

Estimated equipment and staffing needs for this proposed project are shown, below, in Table 2.

TABLE 2. EQUIPMENT LIST AND STAFFING

Role	Estimated # Staff	Materials & Equipment
Water Gap Group	20	• Pisten Bully or equivalent with skid trailer carrying auger/small excavator • Pisten Bully or equivalent with skid trailer Ditch witch RT115 or similar tracked cable plow • Pisten Bully or equivalent with skid trailer carrying Poles • Steiger x2 or similar size vehicle with skid trailer carrying slurry mixer and materials • Tucker Terra or equivalent with Skid trailer/ILA Hut • Ice cutting chainsaws • Water pump • Snowmachines • Steiger or equivalent with fuel skid and zoom boom forklift or bucket truck. • Steiger or equivalent with camp train
Cable Deployment Group	14	• 2x Pisten Bully trail groomers • Pisten Bully or equivalent w/Trailer/Cable • Pisten Bully or equivalent w/Trailer/Crane/Snowmachines 2• x Steiger w/Tandem/Spool carrier(s) • Steiger w/Tandem/Fuel Transport • Steiger or equivalent w/Camp Train • Tucker Terra or equivalent
Splice Crews Group	15	Pisten Bully

		Pisten Bully or equivalent w/Trailer/Splicing trailer 1x Steiger w/Tandem/Fuel 1x Steiger w/Camp Train Pisten Bully w/trailer/supplies Splice tent, tools, splice boxes Snowmachines
HDD group (Alt option dependent)	14	• 2x Pisten Bully equivalent w/HDD equipment • Pisten Bully or equivalent w/HDD support materials/equipment trailer
Bear guards	4	Shotgun, rubber bullets, bear spray, noise makers, other deterrents
Total personnel required	47	
** personnel and equipment may be adjusted to meet schedule, for safety, or to address unforeseen challenges.		** Load capacities will be adjusted to meet the tundra travel requirements based on the tundra conditions and quality of snow pack.

Compliance with NPRA Required Operating Procedures (ROPs)

Quintillion will comply with relevant NPRA ROPs. Specifically,

ROP A-1	Solid Waste Management	Will comply
ROP A-2	Waste Management Plan	Will comply
ROP A-3	Hazardous Materials Emergency Contingency Plan	Will comply
ROP A-4	Spill Prevention, Control, and Countermeasure Plan	Will comply
ROP A-5	Refueling Restrictions	Request Deviation
ROP A-6	Surface Discharge of Reserve Pit Fluids Prohibited	Will comply
ROP A-7	Discharge of Produced Water in Upland Areas and Marine Waters Prohibited	Will comply
ROP A-8	Plans to Minimize Bear-Human Conflicts	Will comply
ROP A-9	Use of Ultra-Low Sulfur Diesel	Will comply
ROP A-10	Prevent Unnecessary or Undue Degradation	Will comply
ROP A-11	Monitoring of Contaminants in Subsistence Foods	Will comply
ROP A-12	Oil Spill Response Plans	Will comply
ROP B-1	Withdrawal of Unfrozen Water from Rivers and Streams During Winter Prohibited	Request Deviation
ROP B-2	Water Withdrawal from Lakes Requirements	Will comply
ROP C-1	Protection of Grizzly Bear, Polar Bear, and Marine Mammal Denning and/or Birthing Locations	Will comply
ROP C-2	Protection of Stream Banks	Will comply
ROP C-3	Maintain Natural Spring Runoff Patterns and Fish Passage	Will comply
ROP C-4	Avoid Freeze-Down of Deep-Water Pools	Will comply
ROP C-5	Minimize Effects of High-Intensity Acoustic Energy on Fish	Will comply

ROP E-2	Protect Fish-Bearing Water Bodies	Will comply
ROP E-3	Maintain Free Passage of Marine and Anadromous Fish	Will comply
ROP E-4	Minimize Potential for Pipeline Leaks	Will comply
ROP E-5	Minimize Impacts of Development Footprint	Will comply
ROP E-6	Reduce Impacts to Wetlands and Floodplains	Will comply
ROP E-7	Minimize Disruption of Caribou Movement and Subsistence Use	Will comply
ROP E-8	Minimize Impacts of Mineral Materials Mining	Will comply
ROP E-9	Avoid Human-Caused Increases in Predator Populations	Will comply
ROP E-10	Minimize Bird Collisions with Infrastructure	Will comply
ROP E-11	Minimize Impacts on Bird Species from Infrastructure	Will comply
ROP E-12	Ecological Mapping Used to Assess Wildlife Habitat	Will comply
ROP E-13	Protect Cultural and Paleontological Resources	Will comply
ROP E-14	Ensure Fish Passage at Stream Crossings	Will comply
ROP E-15	Prevent Loss of Nesting Habitat for Cliff-Nesting Raptors	Will comply
ROP E-17	Manage Activities to Meet Visual Resource Management Objectives	Will comply
ROP E-18	Minimize Impacts Near Steller's or Spectacled Eider Nests	Will comply
ROP E-19	Provide Information on Wildlife Movements During and After Construction	Will comply
ROP E-20	Minimize Impacts to Birds from Utility Infrastructure	Will comply
ROP F-1	Minimize Effects of Aircraft on Wildlife, Subsistence Activities, and Local Communities	Will comply
ROP H-1	Provide Opportunities for Subsistence Participation	Will comply
ROP H-3	Minimize Impacts to Hunting and Trapping	Will comply
ROP I-1	Required Orientation Programs	Will comply
ROP J	Endangered Species Act Consultation	Will comply
ROP L-1	Summer Vehicle Tundra Access	Will comply
ROP M-1	Minimize Disturbance to Wildlife	Will comply
ROP M-2	Prevent Introduction of Non-Native Plant Species	Will comply
ROP M-3	Minimize Impacts to BLM Alaska Sensitive Plant Species	Will comply

OPERATION AND MAINTENANCE

Quintillion will perform intermittent monitoring of the ROW after construction through visual inspection and documentation of the ROW. A final as-built location of the FOC will be provided to BLM upon completion of the project. Impacts from ground vehicles are expected to recover and stabilize during the operational period, within 1-5 years after construction. Operation and maintenance will be minimal once the FOC installation is complete. If repairs are required, Quintillion will take appropriate steps to notify appropriate landowners or leaseholders of impending activities. Quintillion will comply with local, state, and federal regulations associated with this project.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Quintillion will implement Standard Operating Procedures (SOP) for Construction and Operational phases of the Project. Impacts of the Project are expected to be short-term and will occur during the construction period as a result of ground transportation and field work. Project design and implementation of site-specific mitigation measures will minimize impacts of the Project. The FOC will have negligible long-term impacts on air quality, water quality, or noise levels. No permanent wetland or stream impacts are expected from this project. Visual impacts will be minimal. There are no population-level effects to biological resources expected for this project. There should be no noticeable impact on the rural lifestyles of the local social or economic fabric, aside from a brief increase in lodging and fuel sales during construction.

Vegetation and Wetlands

The project will be constructed in winter, resulting in only negligible impacts to vegetation through the direct laying of FOC, which will settle onto the tundra after breakup. The use of winter vehicles in construction will help to protect wetlands and vegetation. Helicopter support will be the primary means of reaching the FOC for maintenance during the operational period, further protecting these resources.

Streams

The impact to streambeds and stream banks will be temporary and minor. Three crossing modes will be used, with specific characteristics of each stream considered in employing the appropriate methodology. The option to use three different site-specific crossing modes will benefit the constructability of the project (and therefore reliability of service), and it will help to minimize environmental impacts. Some stream beds will have cable laid directly on the stream bottom, with sediments expected to cover the FOC in a short period of time. Other stream beds will have FOC plowed in and covered. Others will be crossed aerially. The FOC may be embedded into soils and vegetation of select stream banks. Certain crossings may require the FOC to be anchored to avoid being severed during breakup or periods of higher flow. This may require disturbing soils and vegetation a short distance from the stream bank to further embed the FOC in soils. This method includes post-installation measures to stabilize and/ or restore the bank.

Fish and Fish Habitat

The FOC will be laid in some areas containing inundated wetlands or waterbodies that contain fish habitat; however, impacts of crossings and FOC will not result in population-level effects on fish or other aquatic resources. The FOC may cover very small amounts of habitat belonging to resident fish (e.g., char, whitefish), anadromous fish (e.g., chum salmon, cisco), and other aquatic animals (e.g., insects), but in time the FOC will become covered by wetland / waterbody sediments, resulting in negligible impacts to fish habitat. If negligible amounts of vegetation are impacted during occasional streambank embedment of the FOC in select areas, it should recover within the operational period (1-5 years after construction). Impacts to fish during the operational phase of the project will be negligible. Most maintenance will be helicopter-supported, unless there is need for a tundra-approved vehicle with smooth rubber tires or other approved tires / tracks to reach maintenance sites and engage in a low-water crossing.

Birds

Impacts to habitat of waterfowl (e.g., ducks, eiders) and other migratory birds (e.g., raptors) will be negligible, as the FOC is very thin and will be surrounded by vegetation. There will be no population level impacts associated with this activity. In time, the cable will become covered by wetland / waterbody

sediments or tundra vegetation resulting in negligible impacts to waterfowl and migratory bird habitat. Waterfowl and other migratory birds will not be impacted by construction as it occurs in winter when they will have migrated south. During operation and maintenance, impacts to waterfowl and other migratory birds will be negligible. Quintillion will comply with the MBTA and BGEPA.

Mammals

Some small mammals (e.g., lemmings, voles, foxes), large mammals (e.g., caribou, moose), or other animals (e.g., insects, etc.) may be temporarily and minimally disturbed by ground vehicles during winter construction. Efforts will be made to avoid caribou activity along the route during operation and maintenance activities. However, their habitat impacts will be temporary and will not rise to the level of population-level impacts. As described above, the FOC is expected to sink into the soils or sediments of inundated wetlands and waterbodies where it will ultimately become covered. In areas where the cable is laid upon upland tundra or non-inundated wetland, the vegetation is expected to grow around and over the FOC over time. Small mammals and large mammals will all be able to cross over the FOC without impairment during the first years of the project, and over time, the FOC will sink deeper into the tundra vegetation and wetlands. Impacts to mammals and their habitat during the operational phase of the project will be negligible.

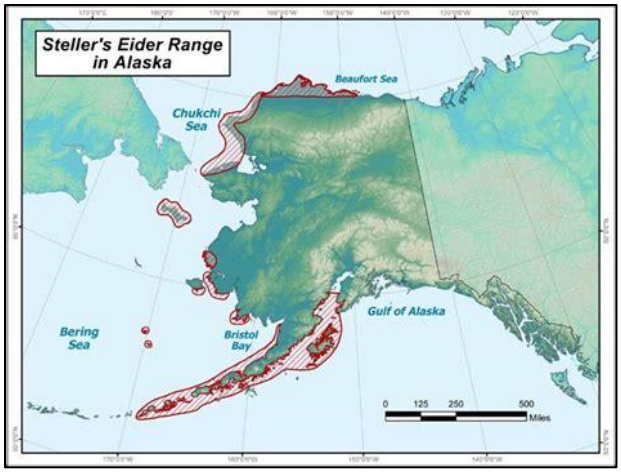
Threatened and Endangered Species

Threatened and Endangered Species and their habitat that have the potential to be temporarily impacted by the project include Steller's eider (summer), spectacled eider (summer), and polar bear (year-round).[5] The summer range of each of these species occurs within the project area (see Figures 10 - 12, below); whereas only polar bear will occur nearby the project in winter. The FOC will cover a lineal segment of habitat used by these species, but in time the FOC will sink into wetland sediments or be covered by tundra vegetation, thereby recovering this habitat. During the construction phase, support crew will scan the ground to ensure that these species are not in the area. Ground vehicles will attempt to avoid any areas known to contain the two eider species during summer operation and maintenance; ground vehicle drivers and crew will scan the horizon and areas in front of the vehicle in attempt to avoid impacting areas containing birds. Polar bears may be present in the project area up to a distance of 25 miles landward of the Chukchi and Bering Sea coasts. The majority of the project will occur within 25 miles of at least one of the two coasts. Sea Ice Critical Habitat and Barrier Island Critical Habitat for polar bear will not be impacted by the project (Figure 13).

Figure 10. Steller's Eider Range in Alaska

Figure 11. Spectacled Eider Range in Alaska

[5] Yellow-billed loon was previously a candidate ESA-listed species, but its listing was determined by USFWS to be not warranted. https://www.fws.gov/species-publication-action/12-month-finding-petition-list-yellow-billed-loon-endangered-or



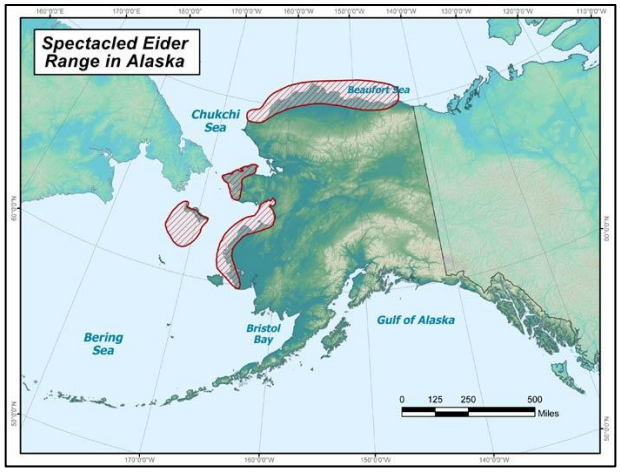
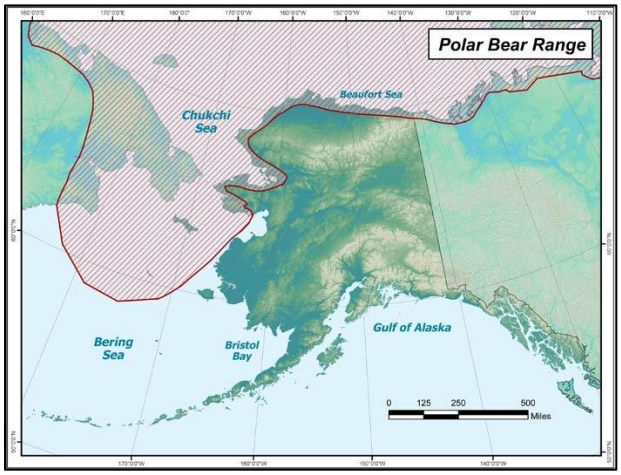
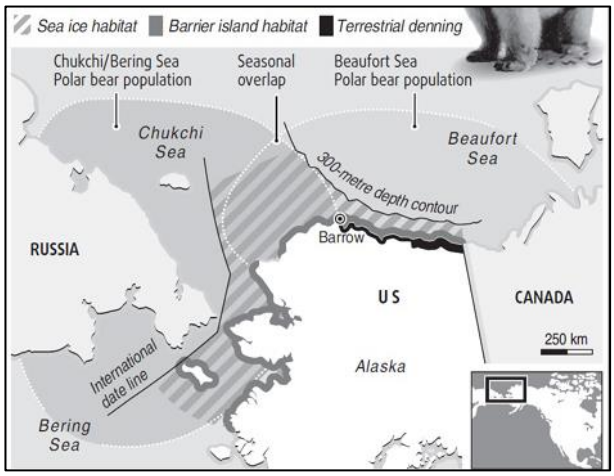


Figure 12. Polar Bear Range in Alaska

Figure 13. Polar Bear Critical Habitat in Alaska





Quintillion has provided to U.S. Fish and Wildlife Service (USFWS) a Polar Bear - Human Interaction Plan to accompany its request for a Letter of Authorization (LOA) for the intentional take of small numbers of polar bears by Level B non-lethal and non-injurious harassment (deterrence) for the protection of life, both human and polar bear, under the terms and conditions to be specified by USFWS, in accordance with sections 101(a)(4)(A), 109(h), and 112(c) of the Marine Mammal Protection Act (MMPA) of 1972, as amended. The Plan describes mitigation measures to avoid interactions and disturbances to polar bears.

The project will aim to completely avoid active or denning polar bears. The CWAT, which has a similar geographic extent as the project, has undergone annual winter construction / operation without impacting polar bears for several years using appropriate mitigation measures. Quintillion aims to take a similar approach to its construction season in avoiding interactions with active or denning polar bears.

Polar bears will be avoided by project crews during construction and operational phases to the extent practicable. Ground vehicles, and/or bear guards will remain in areas with field crews where polar bear habitat exists. Mitigation against human-polar bear interactions generally will be for bear guards or ground crews to scan the horizon and landscape for polar bears while traveling or working. If a polar bear approaches field crews, the crews will employ the prescribed mitigation measures that are described below to avoid impacting polar bears.

Drivers and field crews will constantly scan the horizon for polar bears during construction. If polar bears are detected, crews will take shelter in vehicles until the polar bear leaves the area. If possible, vehicles will move away from the route of sighted polar bears to avoid impacting them or affecting their behavior. Similar procedures will be employed during operation to avoid impacting polar bears.

Bear Guards

For crew safety, crews on the ground splicing FOC in splice tents will be accompanied by bear guards, and ground vehicles. Bear guards will protect crews from bears and other wildlife that may be in the area and become aggressive towards ground crews (e.g., wolf, wolverine).

PLANS, AGENCY REPORTING, AND NOTIFICATIONS

1.) Quintillion will provide the BLM Arctic District Office with regular activities summary reports during construction.

2.) Each year, prior to the start of winter activity, Quintillion will notify BLM of their plans for the season on BLM managed lands.

3.) Quintillion will cooperate with the U.S. Fish and Wildlife Service (USFWS) and other agencies to monitor impacts of project activities on Threatened and Endangered Species. A BLM employee and/or NSB employee will be allowed to accompany Quintillion or contractor personnel during construction, installation, and maintenance of the FOC.

4.) Field crews will follow a Polar Bear Interaction Plan detailing how crews will manage wildlife attractants (food and non-food materials) and respond to human-polar bear interactions. This plan will include the following:
   i. Strategies to minimize attraction of wildlife to activity sites.
   ii. Organizing layout of buildings and work sites to minimize human/wildlife interactions.
   iii. Warning personnel of bears near work sites and identifying proper procedures to be followed.
   iv. Establishing procedures, if authorized, to discourage wildlife from approaching the work site.
   v. Providing contingencies in the event bears do not leave the site or cannot be discouraged by authorized personnel.
   vi. Establishing proper storage and disposal of materials that may be toxic or attractants to wildlife

5.) Every polar bear observed shall be recorded on a polar bear observation form. Quintillion and their contractors shall obtain this form from the BLM. A polar bear observation report will be provided to the BLM within 60 days of the completion of field operations. This report shall contain information on all evidence of polar bears and the actions taken by the permittee.

6.) Quintillion will provide the BLM with an as-built of the corridor utilized on BLM land for cable installation following project completion. Data will be in the form of ESRI shapefile(s) referencing the North American Datum of 1983 (NAD83).

7.) Vehicles shall be operated in a manner such that the vegetative mat of the tundra is not disturbed and in which blading or removal of tundra or vegetative cover is prohibited unless specifically approved by authorizing officials. Vehicles shall not be abandoned. Movement of equipment through willow (Salix) stands shall be avoided where possible.

8.) A completion report shall be submitted to the NSB within thirty (30) days upon termination of construction activities. This report shall contain the following information:
   i. Actual routes of travel
   ii. A list of vehicles used for any off-road travel, which may have taken place.
   iii. Statement of clean-up activities.
   iv. Methods of disposal of garbage, and other camp debris.
   v. A report covering any known incidents of tundra damage and follow-up corrective actions that may have taken place while operating under this permit.
   vi. Tundra damages that have occurred shall be reported to the NSB Permitting Division.

9.) Field crews will remove all domestic waste from the area of operation and dispose in approved fashion at Utqiagvik or Prudhoe Bay. Mobile sanitary facilities will travel with ground transportation along the route and hauled to an approved disposal site at the completion of the project.

FUTURE PHASES & PLANNING

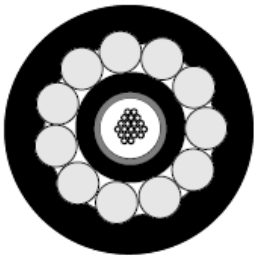
The proposed project is a measure to provide critical backup of an essential service to affected communities. The project will be operating for up to 20 years. In the last year of the operational period, the project team will evaluate next steps and engage in planning and review of options for demobilization and deconstruction.

Appendix A

Fiber Optic Cable Detail

Subaqua optical cable 12294

TC08809



-not to scale-

Cable Design

- **Stainless Steel Tube 316L:** laser welded hermetically sealed stainless steel tube filled with hydrogen scavenger and waterblocking compound
- **Primer:** Primer is applied over the tube to guarantee the proper adhesion between the stainless steel tube and the polyethylene sheath to prevent the longitudinal water propagation.
- **Inner Sheath:** Black HDPE
- **Armour:** high strength galvanized steel wires
- **Outer Sheath:** Black HDPE

Cable Application

Heavy armored cable for underwater or underground applications.

Technical Data

No. of Fibres		24		
Number of Fibres/Tube	-	24		
Cable Weight	kg/km	355		
Cable diameter	mm	13.6		
Nominal Transient Tensile Load (NTTS)	kN	22		
Nominal Operating Tensile Load (NOTS)	kN	11		
Breaking Load (UTS)	kN	45		
Minimum bending radius	mm	Without tension 20 x cable Ø		Under Tension 25 x cable Ø
Temperature Range	°C	Transport & Storage: -60 → +70	Installation: -60 → +45	Operation: -60 → +70

Main Characteristics

Test	Standard	Specified Value	Acceptance Criteria (1)
Tensile Performance	IEC 60794-1-21-E1	See table above	Δl/l fibre ≤ 0.33%, Δα ≤ reversible
Temperature Cycling	IEC 60794-1-22-F1	-30 °C to +70 °C	Δα ≤ 0.05 dB
Water Penetration	IEC 60794-1-22-F5B	3 m sample, 1 m water, 24 h	no water penetration up to inner sheath
Cable bend	IEC 60794-1-21-E	20x Ø cable	Δα ≤ 0.05 dB

(1) values for single-mode fibres, all optical measurements performed at 1550 nm.

Appendix B

MTRS of Project ROW

MTRS				
U009N002E21	U010N001E17	U009N004W12	U009N004W10	U015N014W22
U009N002E22	U010N001E08	U017N018W09	U016N016W26	U014N013W09
U010N006E25	U011N006E36	U013N010W27	U019N019W23	U011N005W12
U009N001E22	U010N006E36	U013N010W25	U009N003W08	U009N001W32
U009N006E34	U010N001E26	U017N018W35	U008N003E23	U013N012W05
U010N006E12	U014N013W08	U012N009W02	U020N019W36	U009N001E21
U012N007W22	U014N013W10	U012N009W03	U015N014W36	U011N002W24
U012N007W36	U014N013W13	U011N005W10	U013N010W29	U016N016W22
U012N009W01	U015N014W26	U011N006W01	U013N010W28	U009N004W05
U011N002W23	U016N016W25	U011N006W04	U012N006W33	U012N008W13
U008N005E27	U008N003E26	U008N004E25	U016N015W21	U011N001W33
U012N006W35	U009N001W35	U008N004E28	U009N001W26	U019N019W26
U009N002E20	U010N001W03	U008N004E27	U011N004W10	U017N016W32
U014N013W14	U009N001W34	U008N004E29	U013N010W32	U013N009W30
U014N013W05	U011N002W20	U008N005E23	U016N016W15	U011N004W06
U013N009W35	U011N002W22	U008N005E26	U012N008W03	U019N018W07
U008N003E25	U011N001W32	U009N006E27	U012N007W26	U010N001E07
U012N008W24	U011N004W08	U021N019W25	U013N009W29	U021N018W07
U008N003E16	U011N004W09	U009N006E23	U009N003E32	U015N014W19
U010N004W29	U011N004W14	U009N006E01	U017N019W01	U009N003W18
U016N016W16	U011N004W22	U017N018W28	U010N001E25	U017N016W31
U013N011W25	U011N004W23	U021N019W36	U010N001W10	U011N007E30
U011N004W11	U011N003W13	U017N018W26	U010N001W11	U011N007E19
U008N006E11	U011N003W16	U013N011W21	U014N013W25	U014N012W31
U008N006E15	U011N003W15	U010N004W17	U011N004W15	U014N012W30
U008N004E26	U011N003W17	U011N006E25	U011N004W13	U009N003E30
U009N006E02	U010N004W32	U010N006E24	U011N002W21	U013N011W18
U011N001W29	U011N004W27	U013N009W28	U014N013W15	U013N010W30
U011N001W34	U012N006W32	U013N009W33	U013N012W13	U010N004W31
U012N008W04	U012N006W34	U013N009W34	U016N015W35	U012N007W19
U015N014W16	U012N006W36	U009N002E24	U010N006E13	U009N004W06
U015N014W23	U009N001W29	U009N002E23	U016N016W23	U011N004W07
U013N010W33	U009N001W25	U020N019W11	U020N019W14	U011N002W18
U009N003W13	U011N004W28	U020N019W25	U017N016W33	U009N002E19
U009N003W17	U022N018W32	U019N019W27	U009N002E25	U008N006E19
U016N016W09	U018N019W15	U011N005W05	U013N012W04	U008N006E18
U014N013W16	U022N018W29	U020N019W24	U020N019W02	U017N017W30

U011N005W03	U018N019W22	U019N019W34	U009N003W14	U021N018W30
U011N005W04	U019N019W24	U016N015W22	U008N005E24	U019N018W06
U011N005W11	U010N004W09	U016N015W29	U013N012W14	U021N018W31
U017N017W28	U010N004W04	U016N015W20	U015N014W17	U022N018W18
U010N001E22	U009N002W25	U016N015W27	U013N012W10	U011N001W30
U010N001E21	U009N002W27	U009N002E17	U009N003W16	U017N018W07
U014N013W24	U010N004W16	U009N002E16	U011N002W25	U008N004E30
U016N016W05	U009N002W28	U016N015W34	U008N005E28	U016N015W30
U009N001E20	U009N002W29	U015N015W12	U008N005E29	U008N005E30
U009N001E23	U022N018W17	U015N015W01	U017N018W08	U010N002E30
U009N003E33	U022N018W20	U015N015W02	U017N018W34	U015N014W18
U008N003E22	U009N003W24	U013N012W12	U009N001W33	U021N018W18
U008N006E16	U012N007W20	U013N012W09	U012N007W35	U010N002E31
U008N006E17	U012N007W21	U013N012W11	U011N003W14	U011N003W18
U017N017W25	U012N008W11	U010N006E01	U018N019W10	U021N018W06
U017N017W26	U012N008W14	U017N019W02	U010N002E32	U009N002W30
U017N017W21	U013N011W17	U016N016W04	U019N019W13	U021N018W19
U017N017W27	U009N003W09	U020N019W23	U018N019W27	U017N018W06
U017N017W36	U011N004W33	U018N019W03	U009N006E22	U009N002W19
U017N017W20	U019N019W01	U009N006E11	U010N001E23	U019N018W18
U017N017W29	U009N004W04	U017N018W21	U013N010W26	U009N001E30
U009N003E29	U009N004W03	U017N018W27	U013N011W16	U009N001W30
U008N006E10	U013N011W24	U017N018W25	U008N003E21	U012N008W06
U015N014W25	U013N011W23	U011N006W03	U015N015W13	U009N001E19
U015N014W21	U012N008W02	U010N001W12	U017N018W16	U015N013W31
U015N014W20	U012N008W05	U012N007W27	U010N004W20	U012N006W31
U008N006E02	U013N011W22	U018N019W34	U009N002W26	U022N018W07
U009N006E14	U009N003W15	U010N001E16	U021N018W05	U011N002W19
U008N003E04	U009N004W11	U009N001E24	U008N003E09	U014N013W06
	U009N004W13	U014N012W32	U018N019W35	U011N005W06

Appendix C

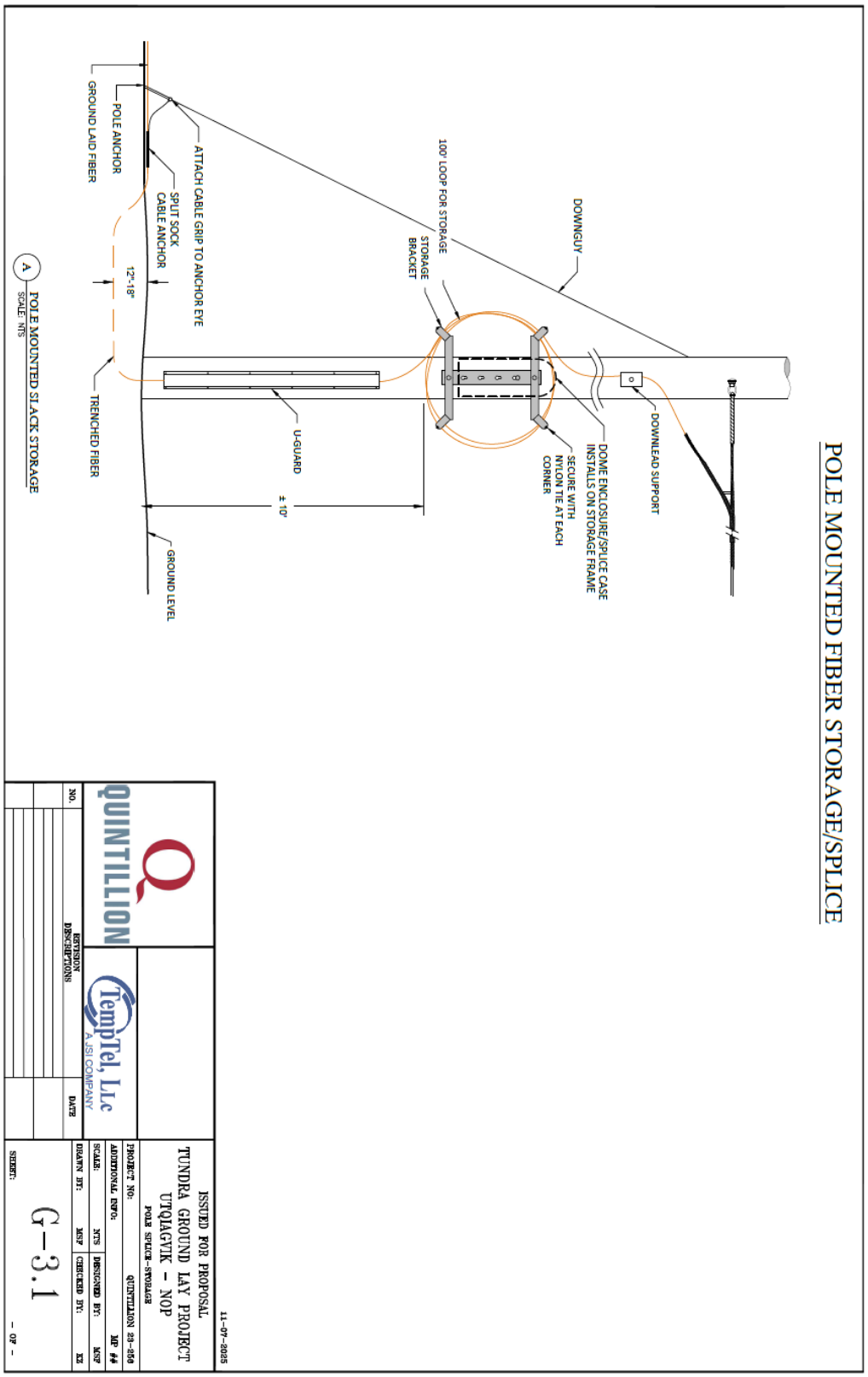
Preliminary Assessment of Stream Crossing Mode

LABEL	DETAIL NUM	GAP TYPE	GAP WIDTH	SPAN	TYPE	Latitude	Longitude	Route
WX-A01	2a	GRAVITY	2		BEADED STREAM	70.1992204	-151.8150271	ALT-A(GMT2)
WX-A02	2a	GRAVITY	1		BEADED STREAM	70.20250967	-151.8448918	ALT-A(GMT2)
WX-A03 Judy Creek	5	AERIAL	150	600	CREEK	70.21027018	-151.885239	ALT-A(GMT2)
WX-A04 Fish Creek	4	AERIAL	290	400	CREEK	70.25157571	-152.1152878	ALT-A(GMT2)
WX-A05	2a	GRAVITY	1		BEADED STREAM	70.28086801	-152.2546591	ALT-A(GMT2)
WX-A06	2a	GRAVITY	6		STREAM	70.28865837	-152.3328205	ALT-A(GMT2)
WX-A07	2a	GRAVITY	1		BEADED STREAM	70.29133127	-152.4084828	ALT-A(GMT2)
WX-A08 Kalikpik River	4	AERIAL	120	260	RIVER	70.29630332	-152.4327337	ALT-A(GMT2)
WX-A09	2a	GRAVITY	1		BEADED STREAM	70.29727561	-152.449471	ALT-A(GMT2)
WX-A10	2a	GRAVITY	1		BEADED STREAM	70.30126762	-152.5838679	ALT-A(GMT2)
WX-B01	2a	GRAVITY	1		BEADED STREAM	70.31369683	-152.8651762	ALT-B(NOP)
WX-B02 Kalikpik River	2a	GRAVITY	40		RIVER	70.29586634	-152.8518183	ALT-B(NOP)
WX-B03	2a	GRAVITY	2		CREEK	70.26479071	-152.9068379	ALT-B(NOP)
WX-B04	2a	GRAVITY	30		CREEK	70.22975859	-152.9299314	ALT-B(NOP)
WX-B05	4	AERIAL	205	330	RIVER	70.18912857	-152.9519455	ALT-B(NOP)
WX-B06	2c	GRAVITY	200		LAKE	70.13489124	-152.7585901	ALT-B(NOP)
WX-B07	5	AERIAL	440	650	RIVER	70.1392957	-152.6270705	ALT-B(NOP)
WX-B08	2c	GRAVITY	100		OXBOW LAKE	70.13151105	-152.5465322	ALT-B(NOP)
WX-B09	2a	GRAVITY	30		STREAM	70.11881265	-152.504651	ALT-B(NOP)
WX-B10	2c	GRAVITY	400		LAKE	70.10660134	-152.4547288	ALT-B(NOP)
WX-B11	4	AERIAL	200	350	RIVER	70.1051708	-152.3171469	ALT-B(NOP)
WX-B12	2c	GRAVITY	2		OXBOW LAKE	70.10210398	-152.2969492	ALT-B(NOP)
WX-B13	2a	GRAVITY	15		BEADED STREAM	70.09681979	-152.1834517	ALT-B(NOP)
WX-B14	2a	GRAVITY	1		STREAM	70.0986994	-152.0639634	ALT-B(NOP)
WX-B15	2c	GRAVITY	150		LAKE	70.12212696	-151.9340807	ALT-B(NOP)
WX-B16	2c	GRAVITY	100		LAKE	70.12228297	-151.9058943	ALT-B(NOP)

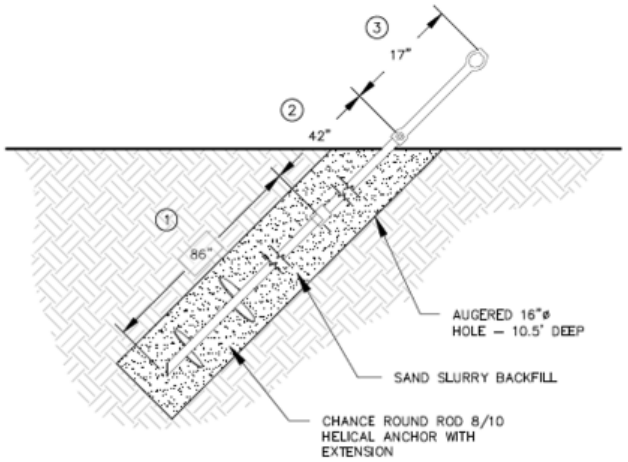
WX-B17	2a	GRAVITY	5		BEADED STREAM	70.12149354	-151.8265371	ALT-B(NOP)
WX-B18 Ublutuoch River	2a	GRAVITY	30		RIVER	70.12691658	-151.6393286	ALT-B(NOP)
WX-B19	2a	GRAVITY	1		BEADED STREAM	70.11715065	-151.561247	ALT-B(NOP)
WX-B20	2c	GRAVITY	105		LAKE	70.10468335	-151.4412007	ALT-B(NOP)
WX-B21 Colville River	6	AERIAL	1280	1400	RIVER	70.077483	-151.3972085	ALT-B(NOP)
WX-B22 Colville River	6	AERIAL	1000	1225	RIVER	70.06952397	-151.4106324	ALT-B(NOP)
WX-B21A-Option-B Colville River	8/6	BORE/AERIAL	1530	1330	RIVER	70.048513	-151.241527	ALT-B(NOP)
WX-B23	2c	GRAVITY	200		OXBOW LAKE	70.03624473	-151.3732134	ALT-B(NOP)
WX-B24	2c	GRAVITY	320		OXBOW LAKE	70.02894834	-151.3349163	ALT-B(NOP)
WX-B25	2a	GRAVITY	5		BEADED STREAM	70.01569321	-151.1760426	ALT-B(NOP)
WX-B26	2a	GRAVITY	40		STREAM	70.01566243	-151.0300591	ALT-B(NOP)
WX-B27	2c	GRAVITY	275		LAKE	70.01420547	-151.0156497	ALT-B(NOP)
WX-B28 Itkillik River	4	AERIAL	315	430	RIVER	70.01576478	-150.8719526	ALT-B(NOP)
WX-B29 Itkillik River	6	AERIAL	750	1260	RIVER	70.02190391	-150.8353266	ALT-B(NOP)
WX-B30	2c	GRAVITY	25		OXBOW LAKE	70.02315686	-150.8319154	ALT-B(NOP)
WX-B31 Kachemach River	4	AERIAL	75	360	RIVER	70.24938629	-150.494635	ALT-B(NOP)
WX-11	2a	GRAVITY	4		BEADED STREAM	70.32258312	-152.9086757	COMMON
WX-12	2a	GRAVITY	40		STREAM	70.3278175	-153.1198183	COMMON
WX-13	2a	GRAVITY	4		BEADED STREAM	70.32851956	-153.1243083	COMMON
WX-14	2a	GRAVITY	3		BEADED STREAM	70.32925647	-153.1291898	COMMON
WX-15	2a	GRAVITY	1		BEADED STREAM	70.34072239	-153.2852742	COMMON
WX-16 Kealok Creek	4	AERIAL	300	510	CREEK	70.34306005	-153.2951571	COMMON
WX-17	2a	GRAVITY			STREAM	70.34414037	-153.3038036	COMMON
WX-18	2a	GRAVITY	1		BEADED STREAM	70.34751216	-153.5061169	COMMON
WX-19	4	AERIAL	90	210	STREAM	70.36012933	-153.6000892	COMMON
WX-20	2a	GRAVITY	15		STREAM	70.3799246	-153.7421702	COMMON
WX-21	2a	GRAVITY	1		BEADED STREAM	70.41871439	-153.9279121	COMMON
WX-22	4	AERIAL	180	410	CREEK	70.42596385	-154.0686902	COMMON
WX-23	2a	GRAVITY	20		STREAM	70.43861944	-154.1920409	COMMON
WX-24	2a	GRAVITY	5		BEADED STREAM	70.44117244	-154.2199856	COMMON
WX-25	4	AERIAL	90	220	STREAM	70.44985547	-154.2872989	COMMON
WX-26	2c	GRAVITY	45		LAKE	70.4527072	-154.557495	COMMON
WX-27	4	AERIAL	350	560	CREEK	70.46295081	-154.6280568	COMMON

WX-28	2a	GRAVITY	30		STREAM	70.47426933	-154.7307372	COMMON
WX-29	2a	GRAVITY	6		STREAM	70.4837044	-154.792611	COMMON
WX-30 Ikpikpuk River	6	AERIAL	630	1270	RIVER	70.48715837	-154.8306356	COMMON
WX-31 Ikpikpuk River	6	AERIAL	670	1090	RIVER	70.4881227	-154.8609284	COMMON
WX-32 Ikpikpuk River	5	AERIAL	550	750	RIVER	70.48792244	-154.9116455	COMMON
WX-33	2a	GRAVITY	1		STREAM	70.4908127	-154.9619922	COMMON
WX-34	2c	GRAVITY	80		CONNECTED LAKE	70.50836559	-155.0195954	COMMON
WX-35	2c	GRAVITY	25		OXBOW LAKE	70.54516021	-155.1158066	COMMON
WX-36 Chipp River	6	AERIAL	725	960	RIVER	70.57268874	-155.221279	COMMON
WX-37	4	AERIAL	90	220	STREAM	70.63928362	-155.4609584	COMMON
WX-38	2c	GRAVITY	40		LAKE	70.66435349	-155.6468582	COMMON
WX-39	2a	GRAVITY	50		STREAM	70.68182353	-155.6575591	COMMON
WX-40	2a	GRAVITY	1		BEADED STREAM	70.69141659	-155.6735148	COMMON
WX-41	2a	GRAVITY	180		STREAM	70.69898966	-155.7107024	COMMON
WX-42	2c	GRAVITY	170		LAKE	70.72251217	-155.7459984	COMMON
WX-43	2c	GRAVITY	50		LAKE	70.72269511	-155.7564008	COMMON
WX-44	2c	GRAVITY	90		LAKE	70.72316986	-155.776518	COMMON
WX-45	2c	GRAVITY	250		LAKE	70.72305982	-155.7790666	COMMON
WX-46 Topagoruk River	4	AERIAL	215	330	RIVER	70.72032981	-155.7923677	COMMON
WX-47	2a	GRAVITY	5		STREAM	70.7081422	-155.8929204	COMMON
WX-48	2a	GRAVITY	20		STREAM	70.76188417	-156.0446957	COMMON
WX-49	2a	GRAVITY	5		STREAM	70.76403023	-156.059783	COMMON
WX-50	2a	GRAVITY	45		STREAM	70.79021591	-156.212705	COMMON
WX-51	2a	GRAVITY	5		BEADED STREAM	70.80539486	-156.368305	COMMON
WX-52 Meade River	6	AERIAL	1040	1500	RIVER	70.79334487	-156.4557567	COMMON
WX-53	2c	GRAVITY	160		LAKE	70.79955063	-156.5142581	COMMON
WX-54	4	AERIAL	300	500	CREEK	70.78482737	-156.5457899	COMMON
WX-55	2a	GRAVITY	15		STREAM	70.78565647	-156.5723333	COMMON
WX-56	2a	GRAVITY	25		STREAM	70.84608076	-156.6801844	COMMON
WX-57 Inaru River	5	AERIAL	340	650	RIVER	70.89067364	-156.83453	COMMON
WX-58	2a	GRAVITY	5		BEADED STREAM	70.91957363	-156.8404714	COMMON
WX-59	2a	GRAVITY	50		STREAM	70.94714253	-156.8334357	COMMON
WX-60	2a	GRAVITY	40		STREAM	70.97157202	-156.8063741	COMMON
WX-61	2a	GRAVITY	12		STREAM	70.99139958	-156.7509385	COMMON
WX-62	4	AERIAL	150	375	RIVER	71.13549747	-156.8192329	COMMON

Appendix D
Water Crossing detail drawings



POLE ANCHOR DETAIL



A NEW ANCHOR ASSEMBLY PF 3-7 KIT
SCALE: NTS

ITEM NO.	QUANTITY	DESCRIPTION
1	1	CHANCE RR 012690AE HELICAL ANCHOR
2	1	CHANCE RR 42" EXTENSION
3	1	CHANCE C1020023 ANCHOR ADAPTER

11-07-2025

QUINTILLION

TempTel, LLc
A JSI COMPANY

NO.	REVISION DESCRIPTIONS	DATE

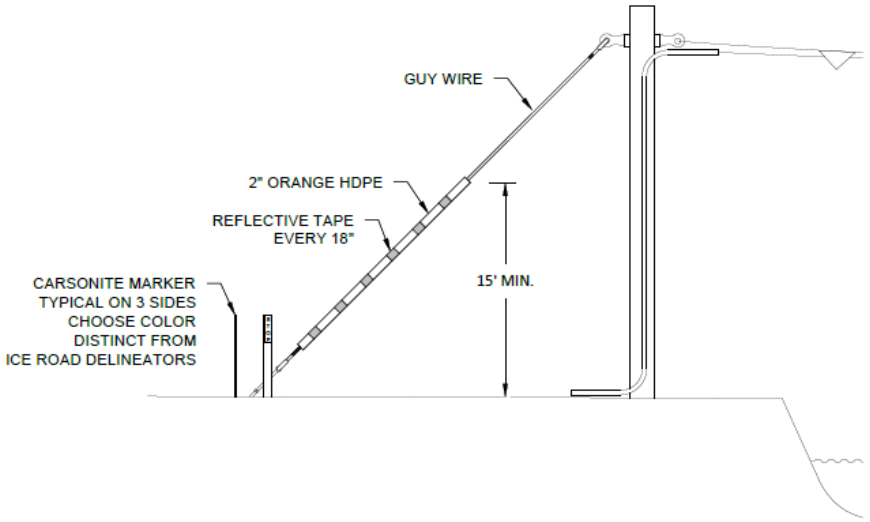
ISSUED FOR PROPOSAL
TUNDRA GROUND LAY PROJECT
UTQIAGVIK – NOP
POLE ANCHOR DETAIL

PROJECT NO:	QUINTILLION 23-256
ADDITIONAL INFO:	MP ##
SCALE: NTS	DESIGNED BY: MSF
DRAWN BY: MSF	CHECKED BY: KZ

G–3.2

SHEET: – OF –

HI-VIZ GUY/ANCHOR MARKER



A HI-VIZ GUY ANCHOR MARKERS
SCALE: NTS

11-07-2025

QUINTILLION

TempTel, LLc
A JSI COMPANY

NO.	REVISION DESCRIPTIONS	DATE

ISSUED FOR PROPOSAL
TUNDRA GROUND LAY PROJECT
UTQIAGVIK – NOP
GUY AND ANCHOR MARKER

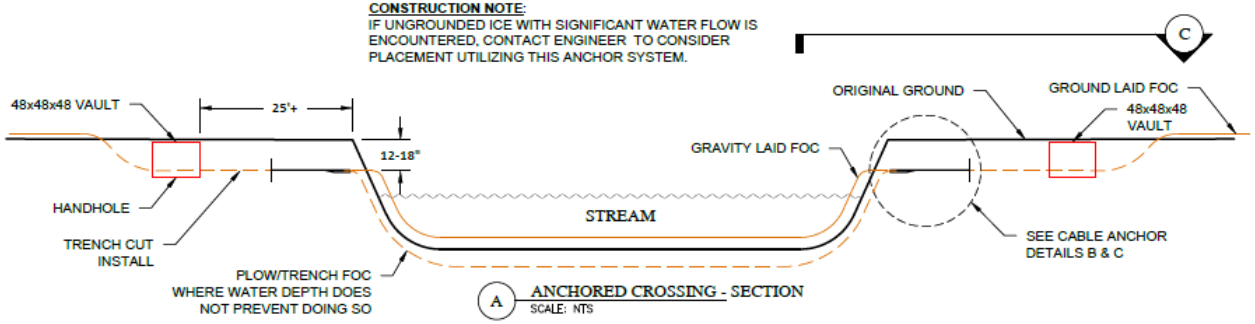
PROJECT NO:	QUINTILLION 23-250		
ADDITIONAL INFO:	MP ##		
SCALE:	NTS	DESIGNED BY:	MSF
DRAWN BY:	MSF	CHECKED BY:	KZ

G-3.3

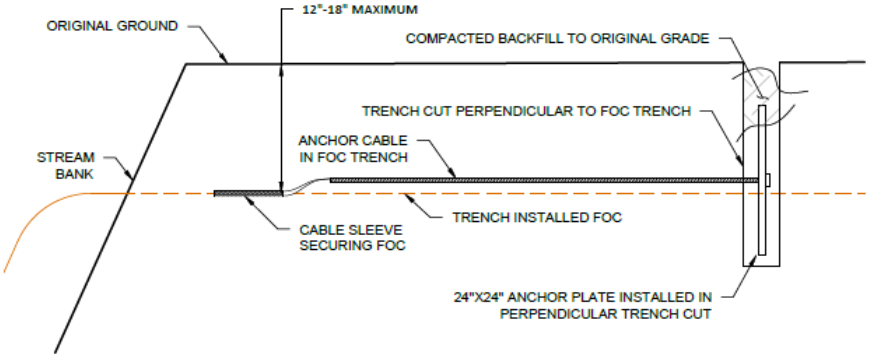
SHEET: – OF –

TYPE 1 - ANCHORED CROSSING

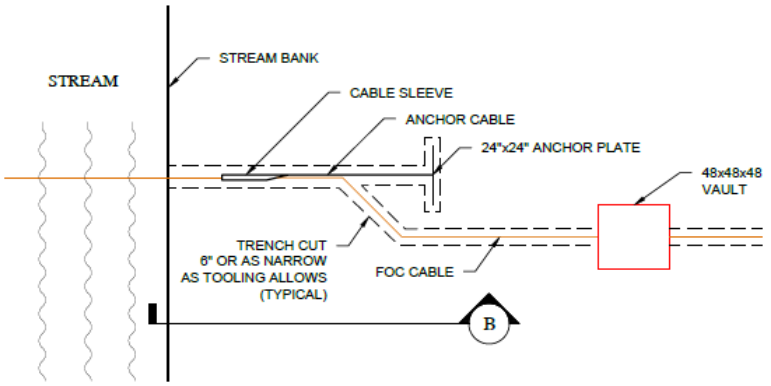
CONSTRUCTION NOTE:
IF UNGROUNDED ICE WITH SIGNIFICANT WATER FLOW IS ENCOUNTERED, CONTACT ENGINEER TO CONSIDER PLACEMENT UTILIZING THIS ANCHOR SYSTEM.



A ANCHORED CROSSING - SECTION
SCALE: NTS



B CABLE ANCHOR DETAIL - SECTION
SCALE: NTS



C CABLE ANCHOR DETAIL - PLAN
SCALE: NTS

11-07-2025

QUINTILLION

TempTel, LLc
A JSI COMPANY

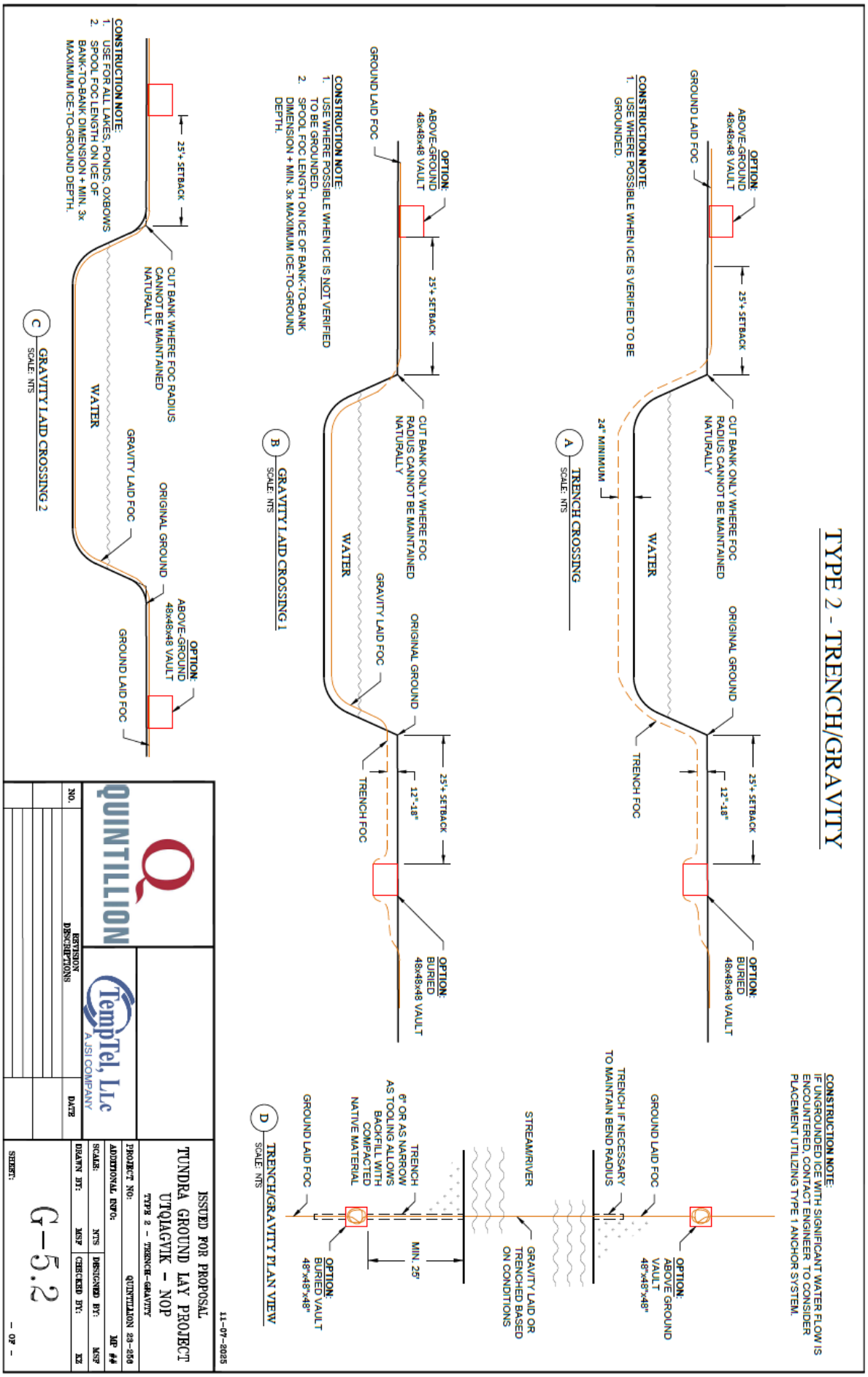
ISSUED FOR PROPOSAL
TUNDRA GROUND LAY PROJECT
UTQIAGVIK – NOP
TYPE 1 – ANCHORED CROSSING

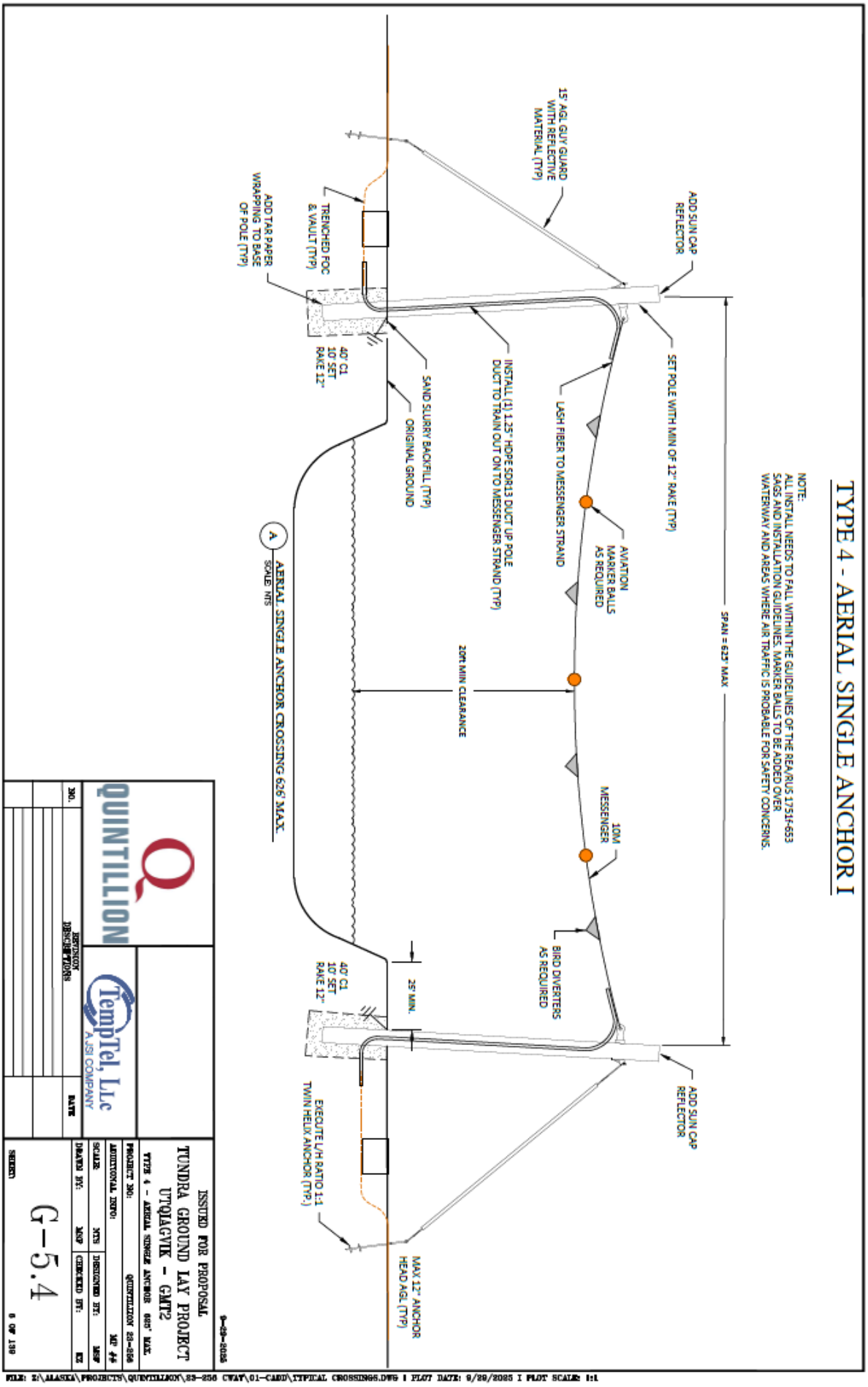
PROJECT NO:	QUINTILLION 23-256
ADDITIONAL INFO:	MP ##
SCALE: NTS	DESIGNED BY: MSP
DRAWN BY: MSP	CHECKED BY: KZ

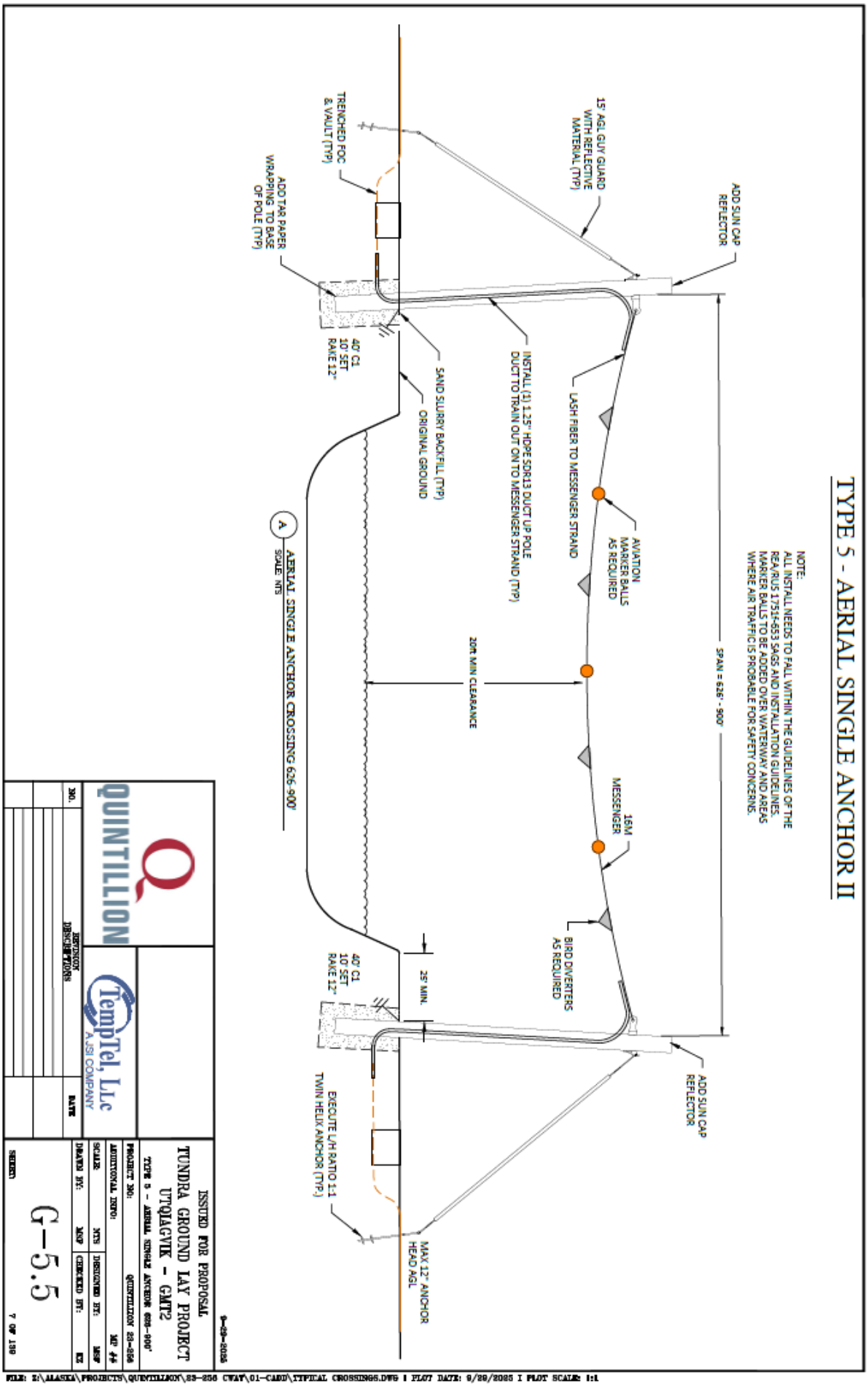
NO.	REVISION DESCRIPTIONS	DATE

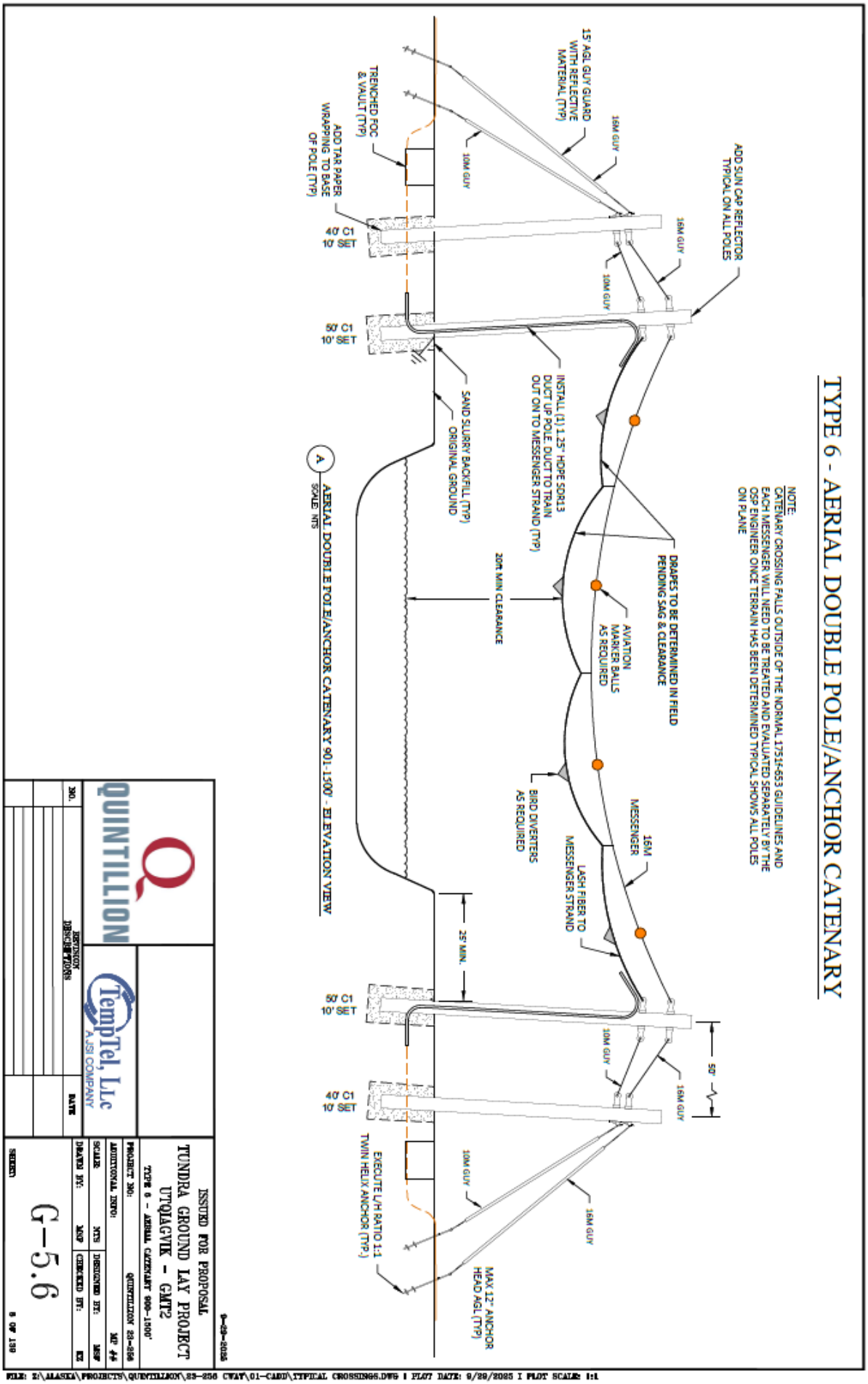
G-5.1

SHEET: – OF –

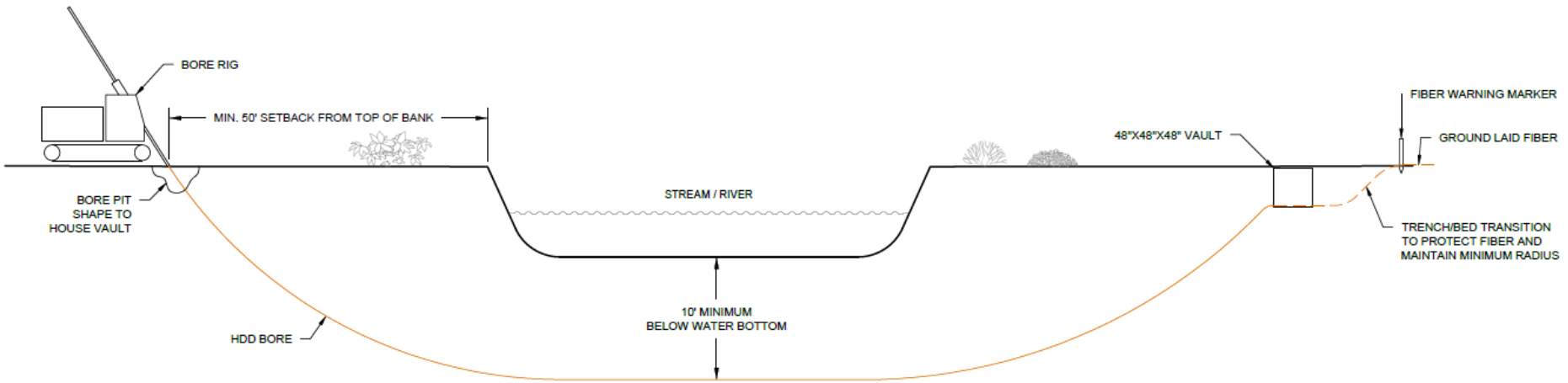

TYPE 2 - TRENCH/GRAVITY
CONSTRUCTION NOTE:
IF UNGROUNDED ICE WITH SIGNIFICANT WATER FLOW IS ENCOUNTERED, CONTACT ENGINEER TO CONSIDER PLACEMENT UTILIZING TYPE 1 ANCHOR SYSTEM.
OPTION: ABOVE-GROUND 48x48x48 VAULT
GROUND LAID FOC
25'± SETBACK
CUT BANK ONLY WHERE FOC RADIUS CANNOT BE MAINTAINED NATURALLY
ORIGINAL GROUND
OPTION: BURIED 48x48x48 VAULT
CONSTRUCTION NOTE:
1. USE WHERE POSSIBLE WHEN ICE IS VERIFIED TO BE GROUNDED.
WATER
TRENCH FOC
12"-18"
24" MINIMUM
A TRENCH CROSSING
SCALE: NTS
OPTION: ABOVE GROUND 48"x48"x48" VAULT
TRENCH IF NECESSARY TO MAINTAIN BEND RADIUS
STREAM/RIVER
GRAVITY LAID OR TRENCHED BASED ON CONDITIONS
6' OR AS NARROW AS TOOLING ALLOWS BACKFILL WITH COMPACTED NATIVE MATERIAL
TRENCH
MIN. 25'
OPTION: BURIED VAULT 48"x48"x48"
D TRENCH/GRAVITY PLAN VIEW
SCALE: NTS
OPTION: ABOVE-GROUND 48x48x48 VAULT
GROUND LAID FOC
25'± SETBACK
CUT BANK ONLY WHERE FOC RADIUS CANNOT BE MAINTAINED NATURALLY
ORIGINAL GROUND
OPTION: BURIED 48x48x48 VAULT
CONSTRUCTION NOTE:
1. USE WHERE POSSIBLE WHEN ICE IS NOT VERIFIED TO BE GROUNDED.
2. SPOOL FOC LENGTH ON ICE OF BANK-TO-BANK DIMENSION + MIN. 3x MAXIMUM ICE-TO-GROUND DEPTH.
WATER
GRAVITY LAID FOC
TRENCH FOC
12"-18"
B GRAVITY LAID CROSSING 1
SCALE: NTS
OPTION: ABOVE-GROUND 48x48x48 VAULT
GROUND LAID FOC
25'± SETBACK
CUT BANK WHERE FOC RADIUS CANNOT BE MAINTAINED NATURALLY
ORIGINAL GROUND
OPTION: ABOVE-GROUND 48x48x48 VAULT
CONSTRUCTION NOTE:
1. USE FOR ALL LAKES, PONDS, OXBOWS
2. SPOOL FOC LENGTH ON ICE OF BANK-TO-BANK DIMENSION + MIN. 3x MAXIMUM ICE-TO-GROUND DEPTH.
WATER
GRAVITY LAID FOC
C GRAVITY LAID CROSSING 2
SCALE: NTS
QUINTILLION
TempTel, LLC
A JSI COMPANY
REVISION DESCRIPTIONS
NO.
DATE
ISSUED FOR PROPOSAL
TUNDRA GROUND LAY PROJECT
UTQIAGVIK - NOP
TYPE 2 - TRENCH-GRAVITY
11-07-2025
PROJECT NO: QUINTILLION 29-250
ADDITIONAL INFO: MP ##
SCALE: NTS
DESIGNED BY: MSP
DRAWN BY: MSP
CHECKED BY: XZ
G-5.2
SHEET: - 07 -


TYPE 4 - AERIAL SINGLE ANCHOR I
NOTE:
ALL INSTALL NEEDS TO FALL WITHIN THE GUIDELINES OF THE REA/RUS 1751F-653
SAGS AND INSTALLATION GUIDELINES. MARKER BALLS TO BE ADDED OVER
WATERWAY AND AREAS WHERE AIR TRAFFIC IS PROBABLE FOR SAFETY CONCERNS.
ADD SUN CAP REFLECTOR
15' AGL GUY GUARD WITH REFLECTIVE MATERIAL (TYP)
TRENCHED FOC & VAULT (TYP)
ADD TAR PAPER WRAPPING TO BASE OF POLE (TYP)
SET POLE WITH MIN OF 12" RAKE (TYP)
LASH FIBER TO MESSENGER STRAND
AVIATION MARKER BALLS AS REQUIRED
10M MESSENGER
BIRD DIVERTERS AS REQUIRED
INSTALL (1) 1.25" HDPE SDR13 DUCT UP POLE DUCT TO TRAIN OUT ON TO MESSENGER STRAND (TYP)
SAND SLURRY BACKFILL (TYP)
ORIGINAL GROUND
40' C1 10° SET RAKE 12"
SPAN = 623' MAX
20ft MIN CLEARANCE
25' MIN.
EXECUTE L/H RATIO 1:1 TWIN HELIX ANCHOR (TYP.)
MAX 12" ANCHOR HEAD AGL (TYP)
A
AERIAL SINGLE ANCHOR CROSSING 626' MAX.
SCALE: NTS
ISSUED FOR PROPOSAL
9-29-2025
TUNDRA GROUND LAY PROJECT
UTQIAGVIK - GMT2
TYPE 4 - AERIAL SINGLE ANCHOR 626' MAX.
QUINTILLION
TempTel, LLC
A JSI COMPANY
PROJECT NO: QUINTILLION 25-256
ADDITIONAL INFO:
SCALE: NTS
DESIGNED BY: MEP
DRAWN BY: MAP
CHECKED BY: KE
DESCRIPTION
DATE
NO.
G-5.4
SHEET
8 OF 130
FILE: Z:\ALASKA\PROJECTS\QUINTILLION\25-256 CWAT\01-CADD\TYPICAL CROSSINGS.DWG I PLOT DATE: 9/29/2025 I PLOT SCALE: 1:1


TYPE 5 - AERIAL SINGLE ANCHOR II
NOTE:
ALL INSTALL NEEDS TO FALL WITHIN THE GUIDELINES OF THE REA/RUS 17/1-653 SAGS AND INSTALLATION GUIDELINES. MARKER BALLS TO BE ADDED OVER WATERWAY AND AREAS WHERE AIR TRAFFIC IS PROBABLE FOR SAFETY CONCERNS.
ADD SUN CAP REFLECTOR
15' AGL GUY GUARD WITH REFLECTIVE MATERIAL (TYP)
TRENCHED FOC & VAULT (TYP)
ADD TAR PAPER WRAPPING TO BASE OF POLE (TYP)
SPAN = 626' - 900'
LASH FIBER TO MESSENGER STRAND
AVIATION MARKER BALLS AS REQUIRED
INSTALL (1) 1.25" HDPE SDR13 DUCT UP POLE DUCT TO TRAIN OUT ON TO MESSENGER STRAND (TYP)
SAND SLURRY BACKFILL (TYP)
ORIGINAL GROUND
40' CL 10' SET RAKE 12°
20ft MIN CLEARANCE
16M MESSENGER
BIRD DIVERTERS AS REQUIRED
25' MIN.
ADD SUN CAP REFLECTOR
EXECUTE L/H RATIO 1:1 TWIN HELIX ANCHOR (TYP.)
MAX 12" ANCHOR HEAD AGL
A AERIAL SINGLE ANCHOR CROSSING 626-900'
SCALE: NTS
ISSUED FOR PROPOSAL
9-29-2023
TUNDRA GROUND LAY PROJECT
UTQIAGVIK - GMT2
TYPE 5 - AERIAL SINGLE ANCHOR 626-900'
PROJECT NO: QUINTILLION 23-256
ADDITIONAL INFO:
SCALE: NTS
DESIGNED BY: MEP
DRAWN BY: MAP
CHECKED BY: EZ
SHEET
G-5.5
7 OF 130
QUINTILLION
TempTel, LLC
A USI COMPANY
NO. REVISION DESCRIPTIONS DATE
FILE: I:\ALASKA\PROJECTS\QUINTILLION\23-256 CWAY\01-CADD\TYPICAL CROSSINGS.DWG I PLOT DATE: 9/29/2023 I PLOT SCALE: 1:1


TYPE 6 - AERIAL DOUBLE POLE/ANCHOR CATENARY
NOTE:
CATENARY CROSSING FALLS OUTSIDE OF THE NORMAL 17514-6513 GUIDELINES AND EACH MESSENGER WILL NEED TO BE TREATED AND EVALUATED SEPARATELY BY THE OSP ENGINEER ONCE TERRAIN HAS BEEN DETERMINED TYPICAL SHOWS ALL POLES ON PLANE
ADD SUN CAP REFLECTOR TYPICAL ON ALL POLES
15' AGL GUY GUARD WITH REFLECTIVE MATERIAL (TYP)
TRENCHED FOC & VAULT (TYP)
ADD TAR PAPER WRAPPING TO BASE OF POLE (TYP)
16M GUY
10M GUY
40' C1 10' SET
50' C1 10' SET
INSTALL (1) 1.25" HDPE SDR13 DUCT UP POLE. DUCT TO TRAIN OUT ON TO MESSENGER STRAND (TYP)
SAND SLURRY BACKFILL (TYP) ORIGINAL GROUND
DRAPES TO BE DETERMINED IN FIELD PENDING SAG & CLEARANCE
AVIATION MARKER BALLS AS REQUIRED
20ft MIN CLEARANCE
BIRD DIVERTERS AS REQUIRED
16M MESSENGER
LASH FIBER TO MESSENGER STRAND
25' MIN.
50'
EXECUTE U/H RATIO 1:1 TWIN HELIX ANCHOR (TYP.)
MAX 12° ANCHOR HEAD AGL (TYP)
A AERIAL DOUBLE POLE/ANCHOR CATENARY 901-1500' - ELEVATION VIEW
SCALE: NTS
ISSUED FOR PROPOSAL
TUNDRA GROUND LAY PROJECT
UTQIAGVIK - GMT2
TYPE 6 - AERIAL CATENARY 900-1500'
QUINTILLION
TempTel, LLC
A JSI COMPANY
NO. REVISION DESCRIPTIONS DATE
PROJECT NO: QUINTILLION 23-256
ADDITIONAL INFO: ME ##
SCALE: NTS DESIGNED BY: MSP
DRAWN BY: MSP CHECKED BY: KS
SHEET G-5.6
9 OF 190
9-29-2023
FILE: Z:\ALASKA\PROJECTS\QUINTILLION\23-256 CWAY\01-CADD\TYPICAL CROSSINGS.DWG I PLOT DATE: 9/29/2023 I PLOT SCALE: 1:1

DIRECTIONAL BORE - RIVERS



A DIRECTIONAL BORE
SCALE: NTS

NOTES:

1. CONTRACTOR TO ENSURE SAFE CLEARANCE FROM OVERHEAD FACILITIES PRIOR TO STAGING AND DURING DRILL RIG OPERATIONS.
2. ALL POSSIBLE MEASURES SHOULD BE TAKEN TO REDUCE THE SIZE OF THE BORE PIT AND PRESERVE ANY VEGETATIVE MAT FOR REPLACEMENT AFTER BORING AND TRENCHING IS BACK-FILLED WITH NATIVE MATERIAL.
3. CONTRACTOR RESPONSIBLE FOR ALL BORE LOG AND DEPTHS.
4. CONTRACTOR TO ENSURE STRIKE SENSOR DEPLOYMENT PRIOR TO DRILLING.

11-07-2025

QUINTILLION

TempTel, LLc
A JSI COMPANY

NO.	REVISION DESCRIPTIONS	DATE

ISSUED FOR PROPOSAL
TUNDRA GROUND LAY PROJECT
UTQIAGVIK – NOP
RIVER BORE

PROJECT NO:	QUINTILLION 23-256		
ADDITIONAL INFO:	–		
SCALE:	NTS	DESIGNED BY:	MSF
DRAWN BY:	MSF	CHECKED BY:	KZ

G–5.8

SHEET: – OF –

Appendix E

ICAS Quintillion Letter of Authorization

IÑUPIAT COMMUNITY of the ARCTIC SLOPE
an IRA Regional Tribal Government
P.O. Box 934 · Barrow, Alaska 99723
Ph: (907) 852-4227 1-888-788-4227 Fax: (907) 852-2449

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Iñupiat Community of the Arctic Slope
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Erika Reed
Alaska State Director
Bureau of Land Management
(907) 271-5080
blm_ak_state_director@blm.gov

February 2, 2025

Re: Authorization for Quintillion to Support FY24 FEMA BRIC Grant Activities

FEMA BRIC Subapplication Number: EMS-2023-BR-016-0001
Project Title: Arctic Slope Fiber Optic Network Resiliency Project

Dear Ms. Reed,

The Inupiat Community of the Arctic Slope (ICAS), a federally recognized Tribal government, is the lead applicant for the FY24 FEMA BRIC grant and has partnered with Quintillion Subsea Operations LLC under a formal teaming agreement. As a trusted partner, Quintillion brings critical technical expertise and capabilities to support the design, development, and execution of the proposed infrastructure project. This collaboration ensures that the project aligns with FEMA's objectives of building resilient infrastructure, mitigating risks from natural hazards, and addressing the unique challenges faced by Arctic communities.

The recent Quintillion subsea fiber optic cable break near Oliktok Point has further underscored the need for resilient, redundant connectivity in the region. The outage, which has left multiple Northwest Alaska communities without stable internet access, highlights the vulnerabilities of existing infrastructure—especially given the challenges of making subsea repairs in an ice-covered environment. Quintillion is actively pursuing long-term solutions, including the

construction of a terrestrial "land bridge" fiber route from Utqiaġvik to Deadhorse to create a self-healing network ring.

With this letter, we wish to confirm that Quintillion is acting as an agent and partner with ICAS to apply for and pursue permits with federal and state agencies in conjunction with the FEMA BRIC award to ICAS. This partnership is intended to expedite the approval and construction of the fiber project, which is planned for the March–May 2025 timeframe, ensuring that Arctic communities have access to reliable, high-speed internet and critical communications infrastructure.

We appreciate your support in advancing this essential project and are available to provide any additional information as needed.

Sincerely,

Morrie Lemen
Executive Director
Iñupiat Community of the Arctic Slope